40 Rock (C)

POPULAR Computing WEEKLY

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35p 17-23 November 1983 Vol 2 No 46

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Periodic table
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New releases
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Crossfire on BBC B. See page 10.
GAME★

News Desk

Mirror cracks software market

MIRRORSOFT the software publishing division of the Mirror Newspapers Group has been officially launched with the announcement of its first three titles

The programs have all been written by existing software houses with Mirrorsoft taking the role of publisher According to the Mirror's Jim MacKonochie, the intention is to develop a range of titles for the Commodore 64, BBC Electron and Spectrum computers

"We believe that home computers will become part of the furniture of our everyday lives just like a hi-fi" he said "Mirrorsoft's theme is computing for the family and our first three titles all have in the broadest sense of the term a learning flavour

Continued on page 5

Acorn shot in the arm

ACORN has bought up ICL's Computer Education in Schools division

The purchase reportedly for less than £100 000 will enable the company to provide better support for its machines in schools

The six strong team has been transferred complete from ICL to Acorn's new international office in Maidenhead Dave Roberts who heads up the group of former teachers explained 'We will become the core of education support development within Acorn."

Negotiations between Acorn and ICL began in the summer and ownership transferred to Acorn in mid-October The unit, to be renamed Acorn Computer's Educational Services, will be expanded to provide books, teachers' guides, activity sheets and software for use in all aspects of education

Software is designed by the unit but the programming is contracted out 'Whether we will use Acornsoft remains to be seen" said Dave Roberts

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BRITAIN'S BEST-SELLING MICRO WEEKLY



17-23 November 1983 Vol 2 No 46

SUNSHINE

The Team

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ABC

Registered at the Post Office as a newspaper

This Week

Editorial

The *Daily Mirror's* decision to enter the software market is not a foolhardy attempt to jump on to the computer publishing bandwagon. It is a deliberate decision to become part of a rapidly growing field that is already affecting traditional publishing operations.

Development manager Jim MacKonochie and his team have spent the past 18 months researching the ever-burgeoning home computer market. They have researched the hardware, the software and the users, to an extent where they know more about the market than many existing software houses. In short, they have done their homework.

The intriguing question now is how the other Fleet Street newspapers will react. Already, *The Times* has its *Computer Horizons* spot on Tuesdays, the *Guardian* has just started a *Micro Futures* page on Thursdays, the *Express* has a regular Saturday column and the *Standard* runs an occasional column by Julian Allason.

The prospect of a flood of software from these and other newspapers is unlikely, at least in the immediate future. Newspaper managements tend to be conservative when it comes to new ventures.

Looking a little further ahead, however, it would make excellent sense for newspapers to set up their own software divisions, particularly in specialist areas such as education and science. *Mirrorsoft* may yet be followed by *Sunsoft* and *Timeware*.

Next Thursday

Watch out for the deadly amoeba in Amoeba's Playtime, next week's Star Game for the 48K Spectrum.



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Macmillan links up with Sinclair

BOOK publisher Macmillan has joined up with Sinclair to produce a range of nine new educational software programs.

Learn To Read Parts 1 to 5 have been developed from Macmillan's best-selling primary school reading scheme. The programs were designed by the Centre for Teaching of Reading at Reading University and were written by Fisher Marriott Software. The five titles teach children between the age of five and seven letter recognition, early spelling and positional language. Each skill learnt is consolidated through a short game.

Four titles in a *Science Horizons* series have also been announced. For eight to 12 year olds, the programs are simulations: in *Survival* you become an animal in its habitat, in *Glider* you have to fly a glider as far as possible, *Cargo* involves loading a ship and *Magnets* is a board game. These programs have been developed for Sinclair and Macmillan by West Sussex County Council in association with Five Ways Software.

Further titles will be announced in 1964 and all of the programs are intended for use both at home and in schools. Significantly, all of the titles so far are for the 48K Spectrum only.

At the launch the Rt Hon Harold Macmillan PM, now in his 90th year, said: "In my lifetime the powers of distributing information have grown in a way that could not have been dreamt of in my youth: radio, television and now the microcomputer.

Whether it is to the benefit of mankind — that is for you to decide — but one thing stays the same: what is said is just as important as the means of saying it.

We want to see if, with the combination of Sinclair and my company, we can produce something of real value in the actual work of education."

Each of the nine titles is priced at £9.95.

Mirror

Continued from page 1

Caesar the Cat (£8.95) was written by Andromeda Software for the Commodore 64. The scenario is simple — *Caesar* must climb up the shelves in the larder and avoid the crockery to catch mice.

Widgit Software has produced *Quick Thinking* £6.95 for the 48K Spectrum. Two games, *Sum Vaders* and *Robot Tables*, teach simple arithmetic to children of age seven and up.

First Steps With Mr Men (£8.95) for the BBC B uses the *Mr Men* cartoon characters in simple reading for four to eight year olds and is written by Primer Educational Software.

The launch (predicted in *Popular Computing Weekly*, August 25) comes after 18 months study of the micro software market by the 10 staff of Mirrorsoft.

First Steps is now being converted for the Spectrum and Electron (due December 7) and Commodore 64 (due January 1984). *Quick Thinking* goes on to the Commodore 64 (due this month) and BBC and Electron machines (due December). A Spectrum version of *Caesar the Cat* is under development.

Future Mirrorsoft releases will not necessarily be educational programs. Jim MacKonochie: "We are not always going to publish mass-market titles either. We are prepared to publish any type of software if it is of the highest standard, even in quite specialist markets."

All Mirrorsoft titles will be available through Smiths, Boots and by mail-order from the Mirror Group.

Row over guild ownership

A ROW has broken out over the ownership of Dragon software house — Programmer's Guild UK.

A partnership was formed three years ago between Bob Liddil, founder of the US Tandy software house Programmer's Guild, and Graham Haywood.

Bob Liddil

Haywood in turn was a partner in another venture called Algray with a friend, Alan Wock.

The row centres on a disagreement as to whether Haywood himself or Algray entered into an agreement with Bob Liddil's American Programmer's Guild.

Now Algray has been dissolved and all three parties are claiming half ownership of Programmer's Guild UK.

Programmer's Guild in the US, is now one of the top 25 Tandy Colour Computer houses and has best selling titles such as *Ninja Warrior* and *Pac-Droids* to its credit.

Spectrum learns new language

A NEW language — Micro Prolog — has been announced by Sinclair for the 48K Spectrum.

This version of the logical programming language Prolog has been produced at Imperial College, London, by Logic Programming Associates.

A Prolog program is developed by the user building up a data base of information on a given subject, from which the computer can make logical connections.

Micro-Prolog is available with user manual and Prolog Primer, initially by mail-order only from Sinclair, priced £24.95. An advanced reference manual is in preparation.

Price war cools down

THERE are now signs that the damaging US home computer price-war is ending. Both Atari and Coleco have announced they are putting up their prices.

Atari, which is not taking any more orders for its machines this year, has announced that from January 1 the US wholesale prices of its 600XL and 800XL computers will go up by $40. The present retail prices of the two machines are $199 and $299.

The company has been surprised at the level of orders for its new computers and has only been able to fulfil around 60 per cent of orders placed for Christmas. A spokesman for Atari UK said that at present there are no plans to increase the price of the two machines in Britain.

Coleco has also announced a price increase to come into force at the end of this year. The wholesale price of its Adam computer will rise by $125. This could put up the cost of the Adam — hailed when it was launched as a price breakthrough — by as much as 14 per cent.

Low cost joystick

SPECTRUM STICK is an ingenious low cost joystick for the Spectrum that requires no interface.

Instead, the device clips over the keyboard and, as the joystick is operated, four small 'feet' underneath the unit operate the keys directly.

The Spectrum Stick will only work with games that either use, or can be defined to use, the four cursor keys (keys 5 to 8) on the top row of the Spectrum keyboard.

When not required, the unit can be simply unclipped from the computer.

The Spectrum-Stick costs £9.95 and is available by mail-order from Grant Design, Bank House, Reepham, Norwich, Norfolk.



SITUATIONS AVAILABLE AT

IMAGINE SOFTWARE LTD is the largest and most successful game software house outside of the U.S.A. with more than 100 staff occupying 19,000 square feet of premises throughout Liverpool. Imagine Software are at the forefront of todays exciting software industry. As a result of Imagines advanced and imaginative expansion program the following positions have become available. In all cases renumeration is commensurate with ability and seniority and is above industry standards. In many cases a new car and numerous fringe benefits will be part of the package. Relocation assistance will be given to successful candidates wherever needed.

SENIOR SOFTWARE MANAGER

A position exists for a Senior Manager who will be responsible for several departments working in diverse areas of software design and production. Applicants must have proven experience in commercially orientated software environments and a wide range of technical knowledge and skills

This is a very senior position with many exciting and rewarding aspects. Career prospects are excellent.

SOFTWARE MANAGERS

Two positions exist to manage large software departments at the forefront of the games industry

Applicants must have a proven knowledge and interest in computer games. A wide range of software skills and experience in managing programming staff

SOFTWARE ARTISTS/GAMES PROGRAMMERS

Eight positions are available for programmers with both the technical ability and the creative skills needed to invent and code best selling games

Fluency in at least one assembly language, artistic ability plus proven experience are the necessary qualifications. The successful applicants will be working in an innovative environment with the best available development software and equipment and will be provided with a high level of technical back up. This is the ultimate career opening for games programmers

SYSTEMS SOFTWARE PROGRAMMERS

Two positions exist for systems software programmers working on very advanced products. Both positions are exciting and innovative

For the first, applicants must be fluent in the 'C' language and MCS68000 assembler and be familiar with Unix type operating systems

Applicants must be able to demonstrate a wide knowledge of advanced development tools

The second position requires a fluency in pascal and MCS68000 assembler and familiarity with the UCSD operating system

Experience of computer graphics and general business orientated applications software will be an advantage

PROGRAMMERS

Thirty positions exist for programmers working in a team environment on many diverse aspects of microcomputer software, including the conversion and adaption of games to new microcomputers.

Applicants should be fluent in at least, one assembly language and have great familiarity with at least one currently popular consumer microcomputer. Experience is not necessary but provable ability is a qualifying factor

GRAPHICS PROGRAMMERS

Two positions are available for programmers with skills, experience and knowledge of microcomputer graphics as applied to games software

Applicants must be fluent in at least one popular microcomputer assembly language and preferably have a working knowledge of one other, plus familiarity with currently available microcomputer capability. Provable experience and/or ability essential

COMPUTER MUSICIANS

Two openings are available for programmers who have the ability to write music and sound effects for popular micros.

The applicants must have a good knowledge of an assembly language and proven musical skills

GAME DESIGNERS

Two positions exist for game designers to design a wide variety of entertainment software. Applicants will have both experience in general games design and theory plus a working knowledge of microcomputers

TECHNICAL WRITER

An opening exists for a technical writer to prepare software manuals for both commercial products and internal development tools

A recognised writing qualification will be necessary for applicants as will a very wide working knowledge of microcomputers

GRAPHIC ARTISTS

There are six positions available for artists working on games design and production using computer based graphic tools.

A knowledge of microcomputer graphics plus excellent artistic skills are the qualifications for these positions.

Applicants should in the first instance send thier C.V. to

PERSONNEL DEPARTMENT, IMAGINE SOFTWARE LIMITED
IMAGINE HOUBE, 5 SIR THOMAS STREET, LIVERPOOL L1 6BW
or ring for an application form – **051-236 6100 (20 lines)**

On the offensive from Japan

JAPANESE manufacturers look set to launch a major assault on the UK micro market early in 1984

The major manufacturers have teamed up with Microsoft to produced a common operating standard allowing the different machines all to run the same software

The so-called MSX standard means that the machines — from Toshiba Sanyo Sony Matsushita National and Hitachi — will all be Z80-based and run Microsoft Basic

The MSX computers will be competitively priced and will arrive on these shores at more or less the same time — in the first months of 1984

One manufacturer, however, Spectravideo is already selling two MSX standard computers in this country First deliveries of the company's SV318 and SV328 machines began two weeks ago

Despite being moderately successful in America where they have been on sale for several months the two computers have not received much attention in the UK Peripherals for the machines are expensive and the computers arrived too late to make any impact on this Christmas Bulk deliveries were not available at the time the high street multiples sorted out their peak season buying

The SV318, at £199, has 32K Rom and 32K Ram (with 16K addressable in Basic) It has a built-in joystick cartridge slot and will run a disc drive system with CP/M Graphics features include a 256 x 192 pixel display and 32 user definable Sprites

The SV328 priced at £275 has no joystick built-in but features a keyboard with separate numeric pad 48K Rom and 80K Ram

Both computers require the use of a dedicated cassette player (£44 90)

Add-ons are as follows 7 slot expension unit (£114) into which can go a Centronics interface (£67 90) RS232 (£67 90), disc drive interface (£75 90) — to connect to a slim-line drive (£228 90) — 16K Ram card (£33.50) and 64K card (£102 40)

The speaking Spectrum

SEVERAL major software houses have adapted their Sinclair Spectrum software for use with a new Spectrum speech unit — Microspeech from Currah

Although similar speech add-ons are already available for the computer, Microspeech is the first to receive any substantial software back-up

Leading games house Ultimate Play the Game supports the unit on its latest release *Lunar Jetman* and adventure games specialist Digital Fantasia has included a Microspeech option on four of its mysterious adventures

Other software houses using the unit include Artic, Bug-Byte and Quicksilva

Price for the unit is £29 95 More information from Currah Computer Components, Greythorp Industrial Estate, Hartlepool Cleveland

Playing games in London

GAMES Day 83 held in the Royal Horticultural Hall London on 5-6 November, attracted a large number of visitors Organised by the Games Workshop it provided a meeting point for game players of all descriptions – from hardened Dungeons & Dragons *fans to board gamers and computer gamers Software firms Red Shift and Star Dreams were present as were Steve Jackson and Ian Livingstone authors of the best selling* Warlock of Firetop Mountain

Activision records low results

A SUDDEN slump in US video games sales has been blamed for the poor second-quarter financial results recorded by top American games house, Activision

A net loss of $4 1m for the quarter to October 1, compared with a small first-quarter profit means a net six-month loss of $3 9m Sales for the second-quarter at $13 2m were less than half the figure recorded for the same quarter in 1982

Activision, which produces mainly Atari software, is experiencing the same drop in games sales that last month led Atari to report a huge third quarter loss of $180 3m

Cantab sale

JUPITER Cantab is up for sale, according to Chater & Myhill, who were appointed liquidators for Jupiter on November 8

Full details from Chater & Myhill, Sussex House Hobson Street Cambridge

Up north

THE Northern Computer Fair is to be held at Belle Vue Manchester from Thursday to Saturday November 24 to 26

The show will be open each day from 10 am to 6 pm and entry will cost £3

Rock bottom prices for Texas micros

AMERICAN retailers have now begun the process of unloading an estimated 500 000 Texas Instruments 99/4A home computers at rock-bottom prices

This follows TI's announcement at the beginning of this month that it is to withdraw from the consumer electronics market

With TI's customer rebate scheme still in force for a limited period, it will be possible in some places in the US to pick up a 99/4A machine for as little as $20 — about £14! When the scheme ends the machine will still only cost $49 (£32)

TI, in both the US and Britain, will continue to honour warrenties on the 99/4A Software will continue to be available although hardware peripherals look like being in short supply

Since TI's announcement of its intention to pull out of home computers the company's shares have soared — jumping $22 75 in the first day

Alphacom price cut

DEAN Electronics has cut the price of its Alphacom 32 printer for the Sinclair machines from £99 95 to £59 95

The device, similar to the unit manufactured by Timex for the Sinclair machines in the US, prints on white thermal paper rather than on the metalised rolls used by Sinclair's own ZX Printer

The Alphacom 32 is available by mail order, plus £2 postage from Dean Electronics, Glendale Park Fernbank Road, Ascot Berks

Basic book conversion

THE National Extension College's successful 30-hour BBC Basic tuition book has now been converted for the Spectrum

The Sinclair Basic version, adapted from Clive Prigmore's original by Paul Shreeve, costs £5 95 More details from National Extension College, 18 Brooklands Avenue Cambridge

Down Memotech lane

Andy Pennell delves into the heart of the new Memotech MTX500 micro

The MTX500 is the first computer to be produced by Memotech well known for its ZX81 add-ons, and has been designed to expand from a home computer to a full business machine

The MTX costs £275 and comes complete with 24K Rom and 48K Ram The Ram is divided into two sections — 16K video Ram for the display and 32K user Ram, for programs, etc

The first impression of the machine is the professionalism in construction — it looks very nice indeed, in black with a smart metal facia It is a heavy machine, and over 18in long, so you can appreciate what your hard-earned cash has been spent on

There are a multitude of sockets along the back, consisting of two joystick sockets cassette connections, Centronics printer socket, serial socket, power socket and audio and video output. There is also provision for two RS232 sockets, but these are currently blanked off All the sockets are concealed by being deeply recessed in the case which makes it much harder to actually plug anything into them In addition, the left-hand end of the case has a large expansion socket with all the CPU signals on it — Memotech thoughtfully supply a plastic blanking plate to protect and conceal it when not in use

As well as the main unit a space-age shaped power supply is included which has a long mains lead but a short computer lead This means that it has to sit on the table next to the micro instead of on the floor After switching on I discovered that it is a big nuisance and it makes a terribly loud buzzing noise much louder than even the Spectrum's famous hum This is further amplified as it manages to come through the tv speaker as well

The MTX has a beautiful keyboard, divided into three sections The first is the main alpha numeric area with all the normal keys in the correct places, and is a dream to type on My only grumble is that the return key is too small — I often hit the line feed instead, which is directly above and bigger than the return key This is the best keyboard on any micro under £1,000 I have ever used including the BBC and Commodore machines The two other groups of keys are a so-called numeric pad and eight function keys

Inside the case is what one comes to expect from Memotech — a very neat pcb that holds all the components including the main chips — namely a Z80A processor and TMS9929 graphics chips as well as about 30 others It takes up about two-thirds of the available space — the remaining free area being adjacent to the blanked off RS232 sockets, so I presume that is where the forthcoming communications card is going

On powering up the MTX I had difficulty in tuning my colour tv correctly I eventually managed to get a stable picture of the initial blue screen, but the buzz from the psu was all too apparent from the speaker This would not be a problem if it were not for the fact that the MTX puts its sound through the tv speaker, so you cannot turn the volume right down

After a while, the picture quality deteriorates as the machine warms up, which necessitates re-tuning After experimenting I found that some colours, particularly black, needed the tv retuned again to display properly

Another problem is that the left-most characters on the screen disappear off the side though Memotech makes it less noticeable by not using those positions when listing and editing programs However this sort of software adjustment should not be necessary to correct poor hardware When programs are Run, the missing characters are all too notable by their absence

I also tried a colour monitor using the video output of the MTX and achieved similar results but in black and white After contacting Memotech they told me that to get a colour video signal I would have to change a link on the pcb — surely it should be supplied set up for colour?

They also said that they are working on the problem of display quality which is mainly due to the Texas chip I can believe it after using a CGL M5 which also uses the Texas chip as it has similar distortion problems

It is a shame about the tv circuitry because the graphic effects possible using the Texas 9929 chip are very good It has four modes, only two of which are necessary and available from Basic In text mode the display is 40×24 characters with no graphics and only two colours — foreground and background or a la Sinclair *Ink* and *Paper*

The MTX graphics mode gives 16 colours and a resolution of 256×192 pixels which is about average nowadays though the colour resolution is 64×192 which exceeds many such as the Spectrum When in this mode text can be printed in colour in a 32×24 form

The major graphics facility of the MTX is that you can have up to 32 sprites on the screen at once Sprites are objects up to 32×32 pixels each that co-exist with the graphics screen They each have a priority so that some move in front of others while they all move in front of the graphics screen

This makes it very easy to write games even from Basic For example you can print the background, set up one sprite for your man and another for each alien Moving them is trivial as you do not have to plot and unplot them — the Texas chip does all the hard stuff The only limit is that a maximum of four sprites can be on one vertical position — any more become invisible

On switching on the MTX, the message *Ready* appears at the very bottom of the screen with the cursor four lines above it I thought at first that something was wrong but in fact when editing programs the display is divided into three sections, or virtual screens The main one is the top 19 lines where all printout and listings appear the very bottom line is another for error messages and the remaining one is the four lines above that where lines are entered and edited

Trying to type in my first program without reading the manual revealed two unusual features of MTX Basic — the first was that spaces are absolutely critical and must follow line numbers and separate commands which takes some getting used to

The second feature was that each line is checked for syntax before entering into the program Sinclair style which is terrific and ideal for the beginner If a line is not correct, then the relevant error message appears and the cursor is placed in the line where the syntax failed The line can then be edited and re-entered When a line is correct, it is printed in the upper screen together with its line number if it has one — the MTX accepts line numbers from 0 to 65535 which is most unusual, and appreciated

Editing is performed using the numeric pad, which has the cursor and other special keys on it One unusual feature is that the *Delete* key deletes the character to the right of the cursor which is opposite to the norm However if you think about it it



is the best choice and makes editing lines much quicker

The editing features in general are easy to use and very good However the cursor never changes to indicate the current mode such as Insert or Caps, which can be annoying

Program lines can be a maximum of four screen lines which is usually sufficient Unfortunately, the function keys cannot be programmed to give anything more than graphics characters, unlike the BBC equivalents

The MTX's main language is Basic, but sub-languages Noddy and Z80 assembler are also included The Basic is fairly standard but does have extra commands to handle the machine's graphics and sound capabilities This is the opposite of Commodore for example who supply a skeletal Basic and then charge over £40 for the extra commands you need to use their machines

So-called "structured programmers" will not be very pleased with the MTX facilities, as it lacks procedures *Repeat Until Do While* and other such features But I think procedures apart they are no great omission

The Basic is about average speed, around twice the speed of the Spectrum and half that of the BBC

One thing I didn't like about program testing is that it is impossible to debug graphics programs, as when an error occurs the display switches back to text, with the offending line appearing in the lower screen ready for editing In addition to this the *Continue* command didn't seem to work very often

The MTX hardware excels in the graphics department, and so does the Basic All the features (bar one) can easily be used with appropriate commands, which are very powerful In fact, some commands are too powerful and thus too difficult to use, particularly as the manual is really not very clear

There are commands to create sprites, their shape colour size position direction and speed These latter two make it simple to move things around the screen — just set the sprite up and the machine will move it for you leaving the program to do other things The only thing missing is a function to detect collision between sprites but a delve into the back of the manual soon revealed which I/O location to test

As well as sprite commands, there are commands to plot points, draw lines, draw arcs and draw Oric-style circles (ie ovals!) Colour and associated attributes are easy to control using *Ink Paper, Colour* and *Attr* commands

As well as good graphics capability the MTX boasts the same sound chip as the BBC micro — the Texas 76489 It has three tone channels and one noise channel, and is easily controlled from Basic The volume and frequency envelopes can also be controlled using a much easier method than the 14 parameters needed by the BBC I do wish that there was a *Sound Off* or similar command though as the sound is put through the tv along with the psu buzz

A language new to me called Noddy, is included in the MTX which is designed to make text handling easy especially for beginners It has only 11 commands, which allow pages of text to be printed, and simple choices to be made It is indeed easy to use, but I would personally prefer it to be replaced with commands to make up for the Basic's deficiencies Believe it or not, after entering a program with Noddy the command to run it is *Plod*, named after the well known constable

Something which I am very pleased to see in the MTX is an inbuilt Z80 Assembler/Disassembler for machine code programmers In a similar way to the BBC, lines of Z80 mnemonics can be included in programs, making the writing of machine code much easier Although the assembler is not the most powerful I have seen, it is certainly a welcome addition — it even checks the syntax of each line first!

To help debug machine code, there is also a front panel display, which has a number of interesting features As well as being able to modify and disassemble sections of code, you can set breakpoints, examine and alter register values, and even single step through code I hope other Z80 micro manufacturers (particularly in the Cambridge direction) take note of these great debugging aids

Unfortunately, the Basic does not have many debugging aids lacking line delete renumber and any hex to decimal conversion This latter omission makes it difficult to use some of the machine's more advanced features as the system variables and assembler listings are only in hex

The Basic does have other oddities such as *Let* being compulsory no *Tab* command for printing and an inaccurate *Pause* statement The error messages are all brief and ambiguous — the manual is little help, particularly with the common messages *SE A SE B,SE C* and *A*!

The manual I was supplied with is not a final one, which is just as well as it is not really suitable for the beginner However, a wealth of technical information is given for the expert, though it does omit to mention the useful fact that commands can be entered in an abbreviated form BBC style

The cassette system appears to allow only Basic programs to be saved, loaded and verified with no functions for variables, machine code or screens and no *Merge* function It may be able to do all these things, but the reference part of my manual doesn't mention cassette commands at all

In addition my review machine appears to be incapable of *Saving* any programs though it can load the demo tapes supplied One tape is a very nice version of *Frogger* called *Toado* and the other is a difficult version of draughts Also included is a demo tape a cassette head cleaner and a blank tape

The numeric keypad to the right of the main keys is a boon for editing, as has been mentioned However it cannot normally be used for entering numbers In the manual a *Poke* is given so that it can enter numbers, but even then the 9 key cannot be used as this was inexplicably chosen as the *Break* key Another *Poke* is given so that the 9 key can be used, with the severe disadvantage that any program cannot be stopped I recently discovered that pressing *Shift* with the number keys produced the required digits — the manual makes no mention of this

In conclusion, the MTX is a nice machine, with good graphics and sound abilities and a Basic that can use them In future it should be possible to extend the Ram up to 512K — all of which will be accessible from Basic — and the Rom up to 72K Other peripherals coming soon are RS232, 80 column card and CP/M

The MTX is a good equal to the Commodore 64, with similar user Ram, a better keyboard, equal graphics and sound and similar in price (if you add the cost of Simon's Basic and a machine code monitor) It has the advantage that it works with most cassette recorders, but obviously cannot match the 64 for support yet However sufficient technical information is supplied for software houses to come up with the goods

The MTX is a good games machine and shows the potential for a powerful business machine so long as Memotech sort out the hardware problems ■

Crossfire

A new game for the BBC B by Abdul Nathekar

This game is for the BBC micro, model B, with joysticks. It is for two players and involves controlling their own cross-hair sights

When a player moves his sight directly over the opponent s sight the fire button must be pressed in order to destroy it

The first player to reach 10 is the winner

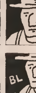
A choice of playing another game is included — if another game is not desired, then control is passed to the user in mode 7. Full instructions are included in the program

Notes

120-230	INITIALISE VARIABLES AND PRINT INSTRUCTIONS
240-280	MAIN PROGRAM
290-590	READ VALUES OF A D PORT AND PLACE IN X% Y% X1% AND Y1%
600-680	DRAW SIGHTS CHECK IF FIRE BUTTON IS PRESSED AND IF ONE SIGHT IS OVER ANOTHER
690-830	AWARD 1 POINT TO WINNER OF EACH GAME AND CHECK IF FIRE BUTTON IS PRESSED TO START
850-890	PRINT THAT GAME WAS A DRAW
910-1070	DISPLAY INSTRUCTIONS
1090 1190	ROUTINE TO ENTER LEFT AND RIGHT PLAYERS NAME
1210-1280	DISPLAY CURRENT SCORE OF EACH PLAYER
1290-1490	DISPLAY NAME OF OVERALL WINNER AND PLAY A TUNE
1500-1600	ASK PLAYERS IF ANOTHER GAME IS REQUIRED IF YES THEN RUN PROGRAM IF NO THEN GO INTO MODE 7 FOR USER CONTROL ■



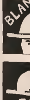


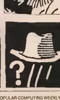








```
10 REM ****************************
20 REM *                          *
30 REM *        CROSS-FIRE        *
40 REM *            BY            *
50 REM *   ABDUL. K. NATHEKAR     *
60 REM *          1983            *
70 REM *         FOR THE          *
80 REM *       BBC MICRO B        *
90 REM *                          *
100 REM ****************************
110
120 *TV255
130 ENVELOPE1,1,4,-4,4,10,30,10,127,0,0,-5,126,126
140 MODE7
150 PROCINST
160 PROCNAME
170 MODE2
180 VDU23,1,0;0;0;0;
190 VDU19,0,4,0,0,0
200 *FX16,4
210 LP%=0:RP%=0
220 XA%=200:YA%=512:XA1%=1079:YA1%=512
230 COLOUR3
240 REPEAT
250 PROCSCORE
260 PROCSIGHTS
270 PROCTEST
280 UNTILFALSE
290 DEFPROCTEST
300 X%=ADVAL(1)DIV64:Y%=ADVAL(2)DIV64
310 X1%=ADVAL(3)DIV64:Y1%=ADVAL(4)DIV64
320 IFX%>500THENXA%=XA%-40
330 IFX%<800THENXA%=XA%+40
340 IFY%>500THENYA%=YA%+40
350 IFY%<800THENYA%=YA%-40
360 IFX1%>300THENXA1%=XA1%-40
370 IFX1%<800THENXA1%=XA1%-40
380 IFY1%>300THENYA1%=YA1%-40
390 IFY1%<800THENYA1%=YA1%-40
400 IFXA%>=1220THENXA%=XA%-40
410 IFXA%<=40THENXA%=XA%-40
420 IFXA1%>=1220THENXA1%=XA1%-40
430 IFXA1%<=40THENXA1%=XA1%+40
440 IFYA%>=964THENYA%=YA%-40
450 IFYA%<=40THENYA%=YA%-40
460 IFYA1%>=964THENYA1%=YA1%-40
470 IFYA1%<=40THENYA1%=YA1%-40
480 ENDPROC
490
500 DEFPROCSIGHTS
510 GCOL0,3
520 MOVEXA%,YA%
530 PLOT1,40,0:MOVEXA%,YA%:PLOT1,-40,0:MOVEXA%,YA%:
    PLOT1,0,40:MOVEXA%,YA%:PLOT 1,0,-40
560 GCOL0,5
550 MOVEXA1%,YA1%
560 PLOT1,40,0:MOVEXA1%,YA1%:PLOT1,-40,0:MOVEXA1%,YA1
    %:PLOT1,0,40:MOVEXA1%,YA1 %:PLOT1,0,-40
580 A=ADVAL(0)AND3
590 IFA=1THENSOUND1,1,150,2
600 IFA=2THENSOUND2,1,200,2
610 IFA=3THENSOUND1,1,750,1:SOUND2,1,200,1
620 IF(XA%=XA1%+1) AND (YA%=YA1%) AND A=1
    THEN B=1:PROCPOINTS(B)
630 IF(XA%=XA1%+1) AND (YA%=YA1%) AND A=2 THEN
    B=2:PROCPOINTS(B)
640 IF(XA%=XA1%+1) AND (YA%=YA1%) AND A=3 THEN
    B=3:PROCPOINTS(B)
650 CLS
660 ENDPROC
670
680 DEFPROCPOINTS(B)
690 CLS
700 COLOUR15
710 VDU19,0,4,0,0,0
730 IFB=3THENPROCDRAW
750 IFB=1THENA$=LP$:LP%=LP%+1 ELSE A$=RP$:RP%=RP%+1
740 IFLP%=10THENLP=1:PROCWINNER(LP):ELSE IFRP%=10THENRP=
    2:PROCWINNER(RP)
750 PRINTTAB(3,9);"ONE POINT FOR"
760 PRINT ' TAB(10-LEN(A$),2);A$;"."
770 PRINT'''PRESS FIRE BUTTON TO'' "       START"
780 TIME=0:REPEATUNTILTIME=750
790 REPEAT
800 A=ADVAL(0)AND3
810 UNTILA=1 OR A=2 OR A=3 ELSE 780
820 GOTO220
830 ENDPROC
840
850 DEFPROCDRAW
860 COLOUR15
870 PRINT''''''''''"   IT'S A DRAW!!"
880 GOTO770
890 ENDPROC
900
910 DEFPROCINST
920 D$=CHR$131
930 PRINTD$;CHR$141"           CROSSFIRE'"
940 PRINTD$;CHR$141"           CROSSFIRE'"
950 D$=CHR$132
960 PRINT  D$;" THE OBJECT OF THIS GAME IS"
970 PRINT D$;"TO MOVE YOUR CROSS-HAIR SIGHT"
980 PRINT'D$;"OVER YOUR OPONENT'S CROSS-HAIR SIGHT"
990 PRINT'D$;"AND FIRE USING THE FIRE BUTTON"
1000 PRINT D$,"ON YOUR JOYSTICK."
1010 PRINT''D$;" THE WINNER OF EACH GAME IS AWARDED"
1020 PRINT'D$;"1 POINT AND THE SCORE FOR BOTH"
1030 PRINT'D$; PLAYERS IS DISPLAYED ON THE TOP"
1040 PRINT'D$;'OF THE SCREEN."
1050 PRINT'CHR$133;CHR$136;"        PRESS SPACE TO START"
1060 REPEAT UNTIL GET$=" "
1070 ENDPROC
1080
1090 DEFPROCNAME
1100 CLS
1110 PRINTTAB(0,3)
1120 PRINTCHR$141;CHR$133"ENTER LEFT PLAYER'S NAME"
1130 PRINTCHR$141;CHR$133 ENTER LEFT PLAYER S NAME"
1140 INPUTLP$
1150 CLS
1160 PRINTTAB(0,4);CHR$141;CHR$131"ENTER RIGHT PLAYER'S NAME'
1170 PRINTTAB(0,5);CHR$141;CHR$131'ENTER RIGHT PLAYER'S NAME
1180 INPUTRP$
1190 ENDPROC
1200
1210 DEFPROCSCORE
1220 PRINTTAB(1,0);LP$
1230 PRINTTAB(LEN(LP$)/2,1);LP%
1240 PRINTTAB(19-LEN(RP$),0);RP$
1250 PRINTTAB(18-LEN(RP$)/2,1);RP%
1260 ENDPROC
1270
1280 DEFPROCWINNER(P)
1290 IFP=1THENG$=LP$
1300 IFP=2THENG$=RP$
1310 VDU19,0,4,0,0,0
1320 CLS
1330 COLOUR3
1340 PRINTTAB(8,7);"THE"
1350 PRINTTAB(6,10);"OVER-ALL"
1360 PRINTTAB(7,13);"WINNER"
1370 PRINTTAB(9,16);"IS"
1380 COLOUR12
1390 PRINTTAB(10-LEN(G$)/2,19);G$
1400 RESTORE1480
1410 FORQ=1TO7
1420 READE,F
1450 READG,H
1440 SOUND1,-10,E,F
1450 SOUND2,-13,G,H
1460 SOUND3,-15,G+50,F
1470 NEXT
1480 DATA149,5,53,5,129,5,33,5,137,5,41,5,145,5,49,5,149,
     5 53,5,157,5,61,5,149,20,53,20
1490 T=TIME+500:REPEAT UNTIL TIME>=T
1500 CLS
1510 PRINT    '''''
1520 PRINT"    DO YOU WANT'
1530 PRINT''"         TO"
1540 PRINT''"    PLAY AGAIN"''
1550 B$=GET$:IFB$=""THEN1550
1560 IFB$="Y"THENRUN
1570 IFC$="N"THENMODE7:END
1580 GOTO1550
1590 ENDPROC
1600 END
```

Acorn reviewed

I have bought most of your magazines dating back to June 1983 but I have not yet seen any articles about the new Acorn Electron Please could you send me details about it or let me know which issue it was reviewed in

Kevin Naker
30 Church Street
Edmonton
London N9 9DU

We reviewed the Electron in our 25-31 August issue You can obtain a copy by sending 50p to Back Issues, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2R 3LD

Arcada Popeye

While on holiday this year I played on an arcade game called *Popeye* I really enjoyed this game and I wondered if any game similar to this was being brought out for the Dragon 32 I hope that you can help me

Catherine French
13 Fairfield
Pontypool
Gwent NP4 0AP

I am afraid that I am unfamiliar with this particular game, but perhaps some of our Dragon readers will be able to help

High score . . . 1

I have just finished reading yet another fun-packed publication (*PCW* 27 October-2 November) It amazes me how you manage to pack into a weekly what others squeeze into a monthly

The letters page was what particularly interested me this week There was one letter that contained some very good ideas on the topic of a high score table (the writer was obviously a chap after my own heart) As I was reading it the idea of a high score chart started to stimulate the old brain and it would certainly put some zest back into the games gathering cobwebs on the shelf

I decided to start up a poll at school to determine the most popular and common games between us micro users This is how it turned out

Dragon
Donkey King (10)
Planet Invasion (8)
Froggar (6)
Scarfman (2)
Spectrum
Jet Pac (15)
Molar Maul (4)
Penetrator (3)

The most popular game for the Vic20 was *Pamc* closely followed by *Jumping Jack*

I am sure that if other readers did a similar poll, the ideal place being the local computer club, a high score table could be put into operation Well I am off now to try and beat my high score at *Donkey King*

M Riley
82 High Street
Farnborough
Kent

PS What does this word "trif" mean?

We would be very interested to know which games our readers think are the best/worst and why.

As for the word "trif", this is slang for terrific.

High score . . . 2

Having bought *PCW* every week, I have read the 'for' and 'against' arguments about high score tables I have an 'against' How do you know whether or not a high scorer has cheated?

I have a BBC model B (and proud of it) and many games But, as an example of how to cheat, I know a memory location to *Poke* 78 lives into Acornsoft's *Planetoid* I obtained a score of 3m and got fed up so I pressed *Break* The number of lives and smart bombs do not show up on the Hall of Fame

I am all for a high score table but without cheating A screen photograph would not be adequate to convince me of a high score

Martin Castree
40 Burnedge Fold Road
Grasscraft
Nr Oldham
Lancashire

PS *Chain Planetoid*' as usual and when it has loaded press escape and enter 150 ?&276B=&7F then Run

Your comments about the fallibility of a high score table are well made. We would like to run such a feature, but we have been unable to come up with a cheat proof method of substantiating high scores either.

Flight simulation

In reply to Kevin Smith's letter in *PCW* 3-9 November Rabbit Software used to make a flight simulation program for the Vic20 called *Night Flight*, but they have now stopped producing it

Just arrived on the market is a program called *Flight Zero One Five* from NKK Micros, 25 Tintagel Close, Winklebury Hants RG23 8JE

Richard Hopkins
9 Shamrock Close
Chichester
Sussex PO19 4TS

Screaming point

One wet Friday, I decided I had outgrown my humble Vic and decided to move up a Commodore step Which is the best and most efficient way of selling I thought? Good old Computer Swap — being free it was ideal

I promptly rang the Computer Swap number and my ad was taken down For the first two weeks I heard nothing but I was sure it would come out on the third week When it didn't, I decided to enquire further 'Probably next issue' I was told

However, another two weeks went by and still nothing I phoned again — this time your lovely girl explained the procedure with the printers, but said that if I gave her the ad again, it would be sent direct to the printers, hopefully with an NB Very blunt, but beautifully polite I was promised it would appear in the issue dated 10 November, another two weeks

8 17 am 10 November, 1983 I paid my 35p willingly without flicking through the pages, knowing it was a fabulous buy anyway With trembling hands, I turned to the back (resisting the urge of even the Automata page) — to my great shock — no ad

I am convinced this case is a one off and my trust in you has not faltered the whole period However after what will have been two months my patience is screaming But, I will resist the temptation to say that you make Sinclair Research look like a telephone service

As my pocket money is limited, I could only afford my humble ad in the local newsagents So, please, please try and include my ad (how about two weeks?)

Dhiraj Aujla (15)
12 Fairfield Approach
Wraysbury
Staines
Middlesex TW19 5DS

PS I think Raymond Blake's idea (*PCW* Letters 10-16 November) is a very good one
PPS Keep the drawing with the star game

Being ever ready to criticise Sinclair *et al* for their faults, it is only fair to admit to a few of our own. There is a backlog on Computer Swap at the moment which may mean a couple of weeks delay However, you should not have had to wait two months

Cover colour

Here is a little program for all avid readers of *Popular Computing Weekly* You simply type in the issue number and your computer will tell you what colour the cover was

```
10 DIM C$ (4 6)
20 FOR A = 1 TO 4
 30 READ C$ (A)
 40 NEXT A
 50 PRINT "ISSUE NUMBER?
 60 INPUT I
 70 FOR A = 1 TO I/4
 80 LET I = I - 4
 90 NEXT A
100 PRINT       THE ISSUE YOU
    WANTED IS  C$ (I + 1)
110 DATA  GREEN      RED
      BLUE   RED
120 RESTORE GOTO 10
```

John Kennedy
32 Bayview Road
Bangor
Co Down
Northern Ireland

Special Christmas offer
order two complete sets and pay only £59 90

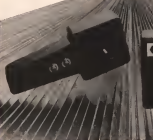
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PCW

The Cambridge connection

***David Kelly** talks to Professor Rogar Needham of Cambridge Computer Laboratory*

Many of the top systems software engineers working for UK micro companies have at one point or another passed through Roger Needham's hands. As head of Cambridge University's Computer Laboratory he has been responsible for some of the brightest computing hopefuls.

Cambridge's Laboratory is one of the most respected and longest established university computer departments. Since its foundation in 1936 it has trod an interesting path, always careful to keep its research practical and always keeping close ties with industry.

Originally, it was set up to investigate analogue computers but in 1946 the department, then run by Morris Wilke, built one of the first digital computers. A number of computing devices had been built but the Cambridge computer, Edsac 1, was the first which could store a program.

In 1949 Edsac 1 was complete — it filled a whole room and used valve switching — and had mercury delay lines for memory. Cambridge Computer Laboratory has been building systems ever since.

The department has grown considerably since the early days. Around 160 students now pass through each year and Roger Needham, who took over from Morris Wilke in 1980, reckons that its post graduate Diploma in Computer Studies is the world's top qualification in the field.

By the time they leave, students will have a good knowledge of programming in Basic, Pascal, BCPL, Fortran, Lisp and even possibly Algol 68. Most of the training is software oriented although the hardware basics are also taught.

"If somebody wants to go into the computing profession in hardware," says Roger, "then they should go to Manchester and not come here!" But he adds: "Making a computer out of a processor, some memory and a few control chips is an operation very like programming — you don't have to be an electronic engineer to do it."

The department's activities are not confined solely to teaching. It has over 40 PhD students carrying out a wide variety of research projects.

"We are technological rather than scientific, so contacts with industry seem both obvious and necessary," says Roger. The department has close ties with companies abroad, like Xerox in California, and with many of the high technology companies in the Cambridge area.

Cambridge Computer Laboratory has always had a "friendly and welcoming" attitude to approaches from companies. One of the companies it has a particularly close association with is Acorn. "Hardly a day goes by when there isn't someone from Acorn here," says Roger.

One of the department's specialities has been the development of local area networks. In the mid seventies it designed the Cambridge Ring — a local network of which around 250 systems are now in use world-wide. The Cambridge Ring was the first "slotted ring" system.

Until its development in 1975, ring networks were only of the "token" type. Each station on the "ring" could only transmit to another station when in possession of a "token" — an electronic bode, which rotated around the network. The token ensured that only one person was able to communicate at a time.

The slotted ring used a different idea. A useful analogy would be a number of electronic codes or "trucks" travelling round the ring into which data can be dumped. The advantage of the slotted Cambridge Ring was that as many stations could transmit as there were "trucks".

Now, Roger Needham's department is working together with Acorn to develop a new faster version of the Cambridge Ring. "If you want it to work faster you have to go straight for special silicon-custom chips. You have to get them made so you need a backer — somebody with the commercial clout to make the chip manufacturers take you seriously."

Such a ring could be ten times as fast as the present one, would be good at transmitting voice signals, and might be available in a few years time as a £50 add-on for a machine like the BBC computer.

By that time Roger reckons there will be a mass market for really cheap networking. "It is one of those things that could suddenly take off in a big way if it was cheap enough to buy and install.

"On the other hand I'm sceptical about so-called 'arm-chair' shopping. People want to see what they are buying and people go out to shop because it causes them to not be at home."

The future of home computers will depend on what they are perceived by their owners to be useful for.

"The impression I have is that machine-code programming on home-computers is only a transition phase."

As different chips come in which support more memory and as prices come down the particular processor used becomes less important — instead the important thing is whether the computer has a respectable language. Ease of programming will become the major consideration. Computer design will still revolve around the central processor.

"We will only get a BBC-type machine produced on a single chip if it helps production. There is not much point in making the physical size of the computer much smaller because that is dictated by the keyboard and the size of people's hands."

One area the laboratory is researching is voice recognition. "It is going to be a long time before you can speak to a computer. The work we are doing is connected with using natural language rather than developing some formal gobbledegook."

There are some big barriers to be overcome. When people listen to spoken English they are very good at differentiating between actual speech and all the other noises and background sounds. This in turn is based on a knowledge of what the conversation is about. Knowing the person who is talking also helps a lot. Getting a computer to do these things is at present not feasible. "A voice-driven typewriter for example would be very difficult.

"I have no doubt that it will be done — but don't hold your breath. It isn't a trivial problem at all.

"There are some quite good speech synthesisers available. I'm not aware of any device you would want to sit down and listen to a bedside story from, though, because that comes back to getting the rhythms and stresses right, and for that you have got to *understand* the text.

"One of the things we have worked on is a program to take a story and summarise it — and we have had a certain amount of success. But there is still an enormous amount of work to do.

"But the 64 dollar question is how much of what you want a computer to do requires experience.

"It is very unusual to see anything new in life! When people do, they are usually not very good at dealing with it. Look at the conflicting descriptions people give who have all seen the same 'flying saucer'.

"This is the problem computers face — it is all new. Everywhere you point a computer's attention it is all new. It is only by limiting what the computer looks at — confining its view — that we will make progress in this area." ■

Through the Spectrum

***Mark Scurrell** presents a round-up of some of the Spectrum software produced in the last 18 months*

This software survey is split into three parts arcade games simulations and adventures I will start off with by far the largest section the arcade-type games

Ultimate Play the Game are a relatively new company who have produced four extremely good games (not to mention their two latest releases)

In *Jetpac* the player controls a spaceman whose task is to assemble his space rocket from a kit which is spread over the planet s surface before filling the rocket with fuel and taking off. While he is doing this, he has to keep aliens at bay and collect gems which are scattered around the planet There are four different spaceships for the spaceman to assemble and eight different alien types all with varying intelligence

The object of *Pssst* is to protect a growing plant from caterpillars bugs and wasps so it can flower the creepies are killed by one of three spray cans While killing the insects grow-bags, watering cans and fly swats appear at random which can be collected for extra points If the player runs into an insect, or the plant is destroyed, a life is lost

Trans Am is the only car game that I have seen for the Spectrum and the scenario is somewhat similar to that of *Mad Max* The game involves the player travelling around a now barren America to collect the eight cups of Ultithate, while driving he has to avoid graves, rocks, cacti and the Black Turbos The dashboard shows the time taken, miles travelled map showing positions of fuel stations radar display speedometer, fuel gauge and engine temperature What is amazing about this game is how it was squeezed into a 16K machine as the total playing area is 600 times the actual screen area!

The last game from Ultimate is *Cookie* In this game the player controls a chef whose job it is to stun the ingredients into his cooking bowl and the nasties into the dustbins If a nasty goes into the cooking bowl more ingredients have to be added before the player goes on to the next level The ingredients consist of Colonel custard Sneaky sugar and Chunky chocolate while the nasties include Mike the Pike Wally Washer and Bernie Bolt

All of Ultimate s games are excellent with smooth, colourful and fast moving graphics good sound effects, and they are very addictive

The games by Imagine Software are also of a high standard The first is *Arcadia* in this game you shoot down wave after wave of aliens with your dual plasma disrupters Your ship is also equipped with an Ion thrust There are 12 different alien types which range from birds to a centipede look-alike The graphics are smooth running and colourful

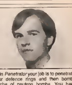
The next game is *Schizoids* which I think is Imagine s worst game. It involves the player controlling a space dozer and pushing 3D cubes and pyramids into a black hole without falling in himself. Although the 3D shapes are good, and the movement is smooth, there is no colour, and the sound what there is of it, is barely audible After about 10 minutes playing this I became very bored

The object of *Molar Maul* is to stop a set of teeth being decayed by the DKs this is done by brushing the teeth with the tooth brush and toothpaste The graphics are very good but there is no sound although the game is addictive and can get very fast

In *Ah Diddums* the player takes over the role of a teddy bear who must escape from the toy boxes by building staircases While the staircase is being assembled from building blocks clockwork soldiers, play people and a toy train hinder the player The graphics, colour and animation are very good although there is a slight screen flicker As the player moves up through the boxes the hazards increase

A graphically very simple game, yet very addictive, is *Jumping Jack* Jack must jump up through several moving layers which have moving holes in them If he falls down a hole he becomes dazed and cannot move for a short while If Jack reaches the top the game restarts and is the same except for obstacles which include moving ambulances and ghosts

Melbourne House publish two arcade type games for the Spectrum The first is a version of *Scramble* and the second is original



In *Penetrator* your job is to penetrate the four defence rings and then bomb the cache of neutron bombs You have to either shoot or avoid the ground-to-air missiles and bomb the radar stations The graphics and sound are excellent and all graphics are smooth moving There is also the option of a training mode and you can customise the landscape Several tunes are played during the game although I found the tune played whenever a life is lost became very annoying after a time

Unfortunately, not up to the high standard set by *Penetrator* is *Terror-Daktil 4D* This is rather like a 3D version of *Galaxians* Instead of the aliens there are the Daktils and instead of a space ship you have a cannon Although the graphics for the swooping Daktils are impressive all movement is by the character square There is no sound during the game except when a Daktil is hit

Horace Goes Skiing by Sinclair is really two games in one. The first part is similar to *Frogger* where *Horace* has to cross the busy road to hire his skis, and then cross back over the road In the second part *Horace* has to ski down the mountain in between the poles The graphics and sound are good, and the game is addictive

Escape and *3D Tunnel* are two games from New Generation Software In *Escape* you control a little man who has to go around the 3D maze and find an axe Once he has the axe he has to smash the door at the top left corner of the maze to get out. It is not as simple as it sounds, though because there are up to five dinosaurs, depending on the skill level in the maze who try to catch you Although the graphics are good and the dinosaurs very clever I found that the game became boring after a time

The object of *3D Tunnel* is to go down the tunnel shooting the bats toads rats and spiders while avoiding the sides of the tunnel In the 48K version you also meet a tube train which has to be avoided The graphics are excellent but again I found the game boring after a while as it takes a long time to move from one stage to another

Slippery Sid *Cyber Rats* and *Starship Enterprise* are all from Silversoft *Slippery Sid* is based on the game *Snake* where the player guides a snake around the screen eating the frogs and avoiding the toads unless a mushroom has been eaten

Every time something is eaten the snake gets longer. The snake must not hit the sides of the screen or hit its tail. The graphics and sound are average but the game is very addictive.

Cyber Rats is loosely based on *Centipede*. The player shoots down the rats (well that's what they are supposed to be) which move down the screen. The game is very average and seemed overpriced.

Starship Enterprise is a revamped version of the old *Star Trek* game with some very good graphics and sounds, although the phasors option leaves a lot to be desired. But overall it is a good game.

Lastly in this section on arcade games is *Galaxians* by Artic. This is like the arcade version in almost every detail. There are nine skill levels and one or two player options.

Let's move on now to simulations — *Golf* and *Flight Simulation*.

Golf is by R & R Software. It gives you the option of playing a nine or 18-hole course. The graphics of the course are reasonable and very colourful. For each shot you play, you have to type in the strength and direction and at the end of each hole the computer displays your overall par and the par for the last hole. I found this game very uninteresting and soon became tired of it.

Flight Simulation by Psion is excellent. It allows the player to land at one of two runways, take off, do rolls and loop the loops, and allows the player to recover from stalls. At any time the player can call up a map which shows his position and which beacon he is locked on to. The main screen shows the view from the cockpit and the instrument panel. The panel has gauges for rate of climb, air speed, altitude, position of flaps, the state of the undercarriage, etc. At the start the player can choose whether to take off, just do the final approach to the runway, or be placed at a random position.

Several adventures are available for the Spectrum. Apart from the *Hobbit* which is undoubtedly the best adventure at the moment, there are *Adventures A, B, C,* and *D* from Artic.

Adventure A is the only one that will fit in a 16K machine and is consequently smaller than the rest. You are stranded on an alien planet and have to find your ship and escape. This is probably the easiest of the adventures, with only a few obstacles.

In *Adventure B* you have to enter an Inca temple to collect the treasure and then get out again. This is not as easy as it seems and there are many pitfalls.

Adventure C is all about reaching a control room to free yourself from an alien ship. In this adventure you meet several characters, some nicer than others.

In *Adventure D* your problems start straight away with your plane about to crash into the Atlantic. You have to escape from the aircraft, reach the island and find he secret without being caught. This is the adventure which I found most difficult.

All of Artic's adventures are written in machine code and so have a very quick response time. Every adventure has a save game option and a help command, which is rarely of use, especially in adventures D and B. Overall Artic's adventures are good, but they can be very strict about the word required at a certain point.

Transylvanian Tower by Richard Shepherd Software is a graphic adventure for the 48K Spectrum. The object of the game is to reach the top of the tower and kill Dracula. You are then given a map with the location of the treasure on it. Despite being loaded as bytes, this game is in Basic. At the beginning of the game, and before moving up a floor, you have to wait three or four minutes. You can also ask for a map, but this takes a long time to draw and the "swooping vampire bats" are simply bat characters appearing at random positions at the top of the screen ■

Program	Graphics	Playability	Lasting Quality	Value for Money	Memory	Joystick	Price	Publisher
							£	
Jetpac	10	10	9	10	16 48	K	5 50	U
Pssst	10	8	9	10	16/48	K	5 50	U
Trans Am	8	9	8	10	16 48	K	5 50	U
Cookie	10	8	9	10	16 48	K C	5 50	U
Arcadia	9	9	8	10	16 48	—	5 50	I
Shizoids	7	3	1	2	16 48	—	5 50	I
Ah Diddums	9	8	8	9	16 48	F	5 50	I
Molar Maul	10	8	7	8	16 48	F	5 50	I
Jumping Jack	7	8	9	8	16 48	F	5 50	I
Penetrator	9	9	9	8	48	—	6 95	MH
Terror Daktil 4D	7	6	3	5	48	—	6 95	MH
Horace Goes Skiing	8	7	7	7	16 48	—	5 95	S
Escape	8	7	6	7	16 48	—	4 95	NG
3D Tunnel	9	8	4	7	16 48	K C	5 95	NG
Slippery Sid	5	8	9	7	16 48	K	5 95	SS
Cyber Rats	6	8	5	7	16 48	K	5 95	SS
Starship Enterprise	7	7	6	7	16 48	K	5 95	SS
Golf	6	5	4	8	16 48		3 75	RR
Flight Simulation	9	9	9	8	48	—	7 95	S
Adventure A	—	7	7	7	16 48	—	8 95	A
Adventure B	—	7	7	7	48	—	8 95	A
Adventure C	—	7	8	7	48	—	8 95	A
Adventure D	—	7	7	7	48	—	8 95	A
Galaxians	9	9	8	9	16 48	K	4 95	A
Trans. Tower	6	6	4	6	48	—	6 50	RS

Key

U Ultimate Play the Game, The Green, Ashby de la Zouch, Leicestershire, LE6 5JU

I Imagine Software, Masons Buildings, Exchange Street East, Liverpool, Merseyside, L2 3PN

MH Melbourne House, 131 Trafalgar Road, Greenwich, London SE10

S Psion/Sinclair Research Ltd, Camberley, Surrey, GU15 3BR

NG New Generation Software, Freepost BS3433, Oldland Common, Bristol, BS15 6BR

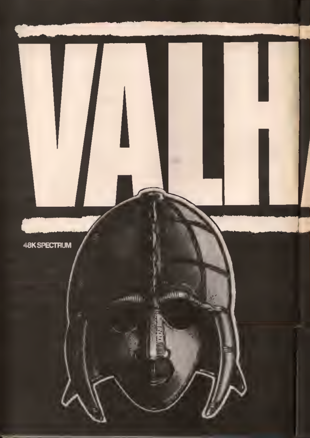
SS Silversoft Ltd, London House, 271/273 King Street, London W6

A Artic Computing Ltd, 396 James Reckitt Avenue, Hull, N Humberside, HU8 0JA

RS Richard Shepherd Software, Freepost, Maidenhead, Berks, SL6 5BY

RR R & R Software, 34 Bourton Road, Gloucester, GL4 0LE

K = Kempston Joystick
C = Cursor Key Joysticks
F = Fuller Joystick


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POP W 48

The sound of music

Marianne Elliott presents a simple music program for the unexpanded Vic20

This program is for the unexpanded Vic20. It asks for the note names of a song and then for the length of the notes. The program can take up to 200 notes but the number of notes required must be specified at the beginning of the run.

Song Maker will play the song and then give a choice of hearing it again, changing the note lengths, or printing the numbers the Vic uses to represent the notes. It can be used to play songs, experiment with note length, make up tunes and translate songs into Vic numbers for use in Data lists in other programs.

Notes

3-11	Gives the notes available. Flats are represented with an F, eg. EF is E flat. Higher notes with a dash, eg. C′ is an octave above C
20	Sets the number of notes for the run
30	Sets up space to store the notes
40-70	Inputs the notes
80-110	Inputs the lengths of each note
200-550	Checks each note for its Vic number
500-520	Plays each note for the required length.
650	Sends the program back to play the notes again
660	Sends the program back to change the lengths
670 & 540	Sends the program back to play the notes and print the Vic numbers and lengths.
710	Makes the program pause after each 10 notes, so that numbers may be copied down

The program allows just under 2 octaves but more notes could easily be added ■

```
1 REM**SONG MAKER**
2 REM*MARIANNE ELLIOTT
3 PRINT"NOTES -"
4 PRINT"C,C#,D,D#,EF,E,F,F#,"
5 PRINT"G,G#,AF,A,BF,B,C′,C#′"
6 PRINT"D′,D#′,EF′,E′,F′,F#′"
7 PRINT"G′,G#′,AF′,A′,BF′,B′."
8 PRINT"REST - 0"
9 PRINT"ENTER NOTES AS SHOWN,"
10 PRINT"LENGTHS AS NUMBERS."
11 PRINT"HIT A KEY"
12 GETY$ IFY$=""THEN12
14 PRINT"(200 MAXIMUM)"
15 PRINT"HOW MANY NOTES & RESTS"
20 INPUTX
30 DIMA$(200),A(200)
40 FORI=1TOX
50 PRINT"INPUT NOTE"
60 INPUTA$(I)
70 NEXTI
75 PRINT""
80 FORI=1TOX
90 PRINT"INPUT LENGTH - ",A$(I)
100 INPUTA(I)
110 NEXTI
130 POKE36878,15
195 IFY$="3"THENPRINT"NOTE",
    "LENGTH"
200 FORI=1TOX
210 IFA$(I)="C"THENS=195
220 IFA$(I)="C#"THENS=199
230 IFA$(I)="D"THENS=201
240 IFA$(I)="D#"ORA$(I)="EF"
    THENS=203
250 IFA$(I)="E"THENS=207
260 IFA$(I)="F"THENS=209
270 IFA$(I)="F#"THENS=212
280 IFA$(I)="G"THENS=215
290 IFA$(I)="G#"ORA$="AF"THENS=217
300 IFA$(I)="A"THENS=219
310 IFA$(I)="BF"THENS=221
320 IFA$(I)="B"THENS=223
330 IFA$(I)="C′"THENS=225
340 IFA$(I)="C#′"THENS=227
350 IFA$(I)="D′"THENS=228
360 IFA$(I)="D#′"ORA$(I)="EF′
    "THENS=229
370 IFA$(I)="E′"THENS=231
380 IFA$(I)="F′"THENS=232
390 IFA$(I)="F#′"THENS=233
400 IFA$(I)="G′"THENS=235
410 IFA$(I)="G#′"ORA$(I)="AF′
    "THENS=236
420 IFA$(I)="A′"THENS=237
430 IFA$(I)="BF′"THENS=238
440 IFA$(I)="B′"THENS=239
445 IFA$(I)="0"THENS=0
500 FORN=1TOA(I)
510 POKE36875,S
520 NEXTN
530 POKE36875,0
540 IFY$="3"THENGOSUB700
550 NEXTI
600 PRINT"1.PLAY IT AGAIN"
610 PRINT"2.CHANGE LENGTHS"
620 PRINT"3.PRINT NOTE NUMBERS"
630 PRINT"4.EXIT PROGRAM"
640 GETY$ IFY$=""THEN640
650 IFY$="1"THEN200
660 IFY$="2"THEN75
670 IFY$="3"THEN195
680 IFY$<>"4"THEN640
690 POKE36878,0 END
700 PRINTS,A(I)
710 IFINT(I/10)=I/10THENGOSUB750
720 IFI=XTHENGOSUB750
740 RETURN
750 PRINT"HIT A KEY"
755 GETD$ IFD$=""THEN755
760 RETURN

READY.
```



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Tipping the scales

Keith and Steven Brain conclude their demonstration of a graphic music editor

Adding to the strings

Once the screen display has been updated an *On Gosub* related to the note (NO) on the scale sets *NO$* to the correct octave and note format for *Playing*. On *Return PL$* is built up by adding 'L' to four times the value of the key pressed (*A*•4) and *NO$*

```
250 ON NO GOSUB 260 270 280 290 300 310
    320 330 340 350 360 370 380 390 PL$ =
    L + RIGHT$ (STR$ (A*4) 2) + NO$ GOSUB
    400 X = X + 20 GOTO 20
260 NO$ = O2C " RETURN
270 NO$ = O2D  RETURN
280 NO$ = "O2E " RETURN
290 NO$   O2F " RETURN
300 NO$ = O2G  RETURN
310 NO$ = O2A  RETURN
320 NO$ = O2B  RETURN
330 NO$ = O3C  RETURN
340 NO$ = O3D  RETURN
350 NO$ = O3E  RETURN
360 NO$ = O3F  RETURN
370 NO$   O3G " RETURN
380 NO$   O3A  RETURN
390 NO$ = O3B  RETURN
```

The subroutine at 400 is now called. This inserts the current string (*PL$*) into the total string (*PA$(LI)*). XS is calculated from the current screen position and defines the breakpoint between two notes. I and SF are used if *PL$* is a sharp or flat (see later).

```
400 XS = ((X  20)/20) * 7) + 1 PA$(LI) = LEFT
    $(PA$(LI) XS  SF) + PL$ + MID$ (PA$ (LI) XS
    + 8 LEN (PA$ (LI)) - 4) RETURN
```

Finally the screen position is updated (X = X + 20) and the program loops back to line 20

Limit tests

After each key press checks are made to ensure that the new cursor position is within limits and XA (distance of current move) is reset to zero

```
20 IF X + XA < 40 THEN X = X - XA ELSE X = X +
   XA
30 IF X + XA > 280 THEN X = X - XA ELSE X = X +
   XA
40 IF X > 240 THEN X = 280
60 XA = 0
```

Other keys

If a key which is not a number in the range 1 to 4 is pressed than a series of other routines may be called

Cursor keys

Logic tests convert left/right cursor key movement into increases in XA (X axis position) and up/down cursor key movement into changes in NO (note position on current line)

```
80 A = ASC (A$) XA = (10 * ((A = 8)  (A = 9))) NO
   = NO + (((A = 10) - (A = 94)))
```

If the note position falls outside limits it is reset to the limit and then the overall Y co-ordinate is calculated from the current line (LI) and note (NO)

```
90 IF NO < 1 THEN NO = NO + 1
100 IF NO > 14 THEN NO = NO - 1
110 Y = (LI * 40) + 22 - (NO * 2)
```

"B" = bar line

If "B" is pressed a bar line is inserted. This is purely decorative and is not added to the string

```
120 IF A$ = B" THEN PUT (X - 15 (LI * 40)) - (X
    - 15 (LI +40) + 16) BA, PSET
```

Shifted cursor

Shifted up and down cursor keys produce a movement from line to line provided the limits are not exceeded. The start position is reset to the left hand and, and the overall Y co-ordinate updated

```
140 IF A = 91 AND LI < 4 THEN LI = LI + 1 X = 40
    Y = (LI * 40) + 22  (NO * 2)
```

```
150 IF A = 25 AND LI > 1 THEN LI = LI - 1 X = 40
    Y = (LI * 40) + 25 - (NO * 2)
```

< spacebar > = delete

Pressing the space bar *Puts* the spare section of stave with *Pset* over the note to be deleted, thus removing it from the screen. At the same time the old note is deleted from *Pa$(LI)* by replacing it with a series of *CHR$(39)*

```
150 IF A = 32 THEN PUT (X - 10 (LI * 40) - 15) -
    (X + 10 (LI * 40) + 31), SP, PSET PL$ = " ""
    GOSUB 400
```

"#" = sharp

The hash sign is used to indicate a sharp and this is *Put* *Pset* rather than *And* to make it clearer. The hash sign appears to the left of the current cursor position and, as SF is set to 1 and I to 7, the hash sign is added to the note to the left of the current cursor position, replacing the trailing *CHR$(39)* in the seven unit block

```
160 IF A$ = # THEN PUT (X - 11 Y - 3) - (X -
    4 Y + 3) SH PSET PL$ = #" SF = 1 I = 7
    GOSUB 400 SF = 0 I = 0
```

"–" = flat

The minus sign indicates a flat and operates in the same way

```
170 IF 43 =  -  THEN PUT (X - 7 Y - 7) - (X - 3,
    Y + 3) FL AND PL$ -  -" SF = 1 I = 7
    GOSUB 400 SF = 0 I = 0
```

"P" = play

"P" leads to the *Play* routine, which first calls the subroutine at 920 which draws the blank manuscript

```
180 IF 43 = P" THEN GOSUB 410
410 GOSUB 920
```

Each line is considered in turn, with the start position (X2) being first set to co-ordinate 40

```
420 FOR PL = 1 TO 4 X2 = 40
```

The string is sliced from position 6 (seventh character) to the end in blocks of seven, and each block is *Played*

Continued on page 25



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```
440 FOR X1 = 6 TO 255 STEP 7
450 PLAYMID$ (PA$ (PL) X1, 7)
```

The end of the actual notes on a line is detected by the presence of two consecutive blocks of *CHR$(39)*

```
460 IF MID$ (PA$ (PL) X1 7) = "  " THEN FL = FL + 1 ELSE FL = 0
460 IF FL > 2 THEN NEXT PL RETURN
```

To recreate the graphics the string segment must be decoded First we must extract the last but one character as *NO$*

```
470 NO$ = MID$ (PA$ (PL) X1 + 7 1)
```

NO$* is compared against the scale of notes in *VN$ with *Instr* to set N1 to the number of the note on the scale The actual Y1 position can now be calculated

```
480 VN$ = CDEFGAB N1 = INSTR (1 VN$ NO$) Y1 = (PL * 48) + 22 - (N1 * 2)
```

Octave can only be 2 or 3, so we only need a check for 3 in position five to know whether to move Y1 up for the higher octave

```
490 IF MID$ (PA$ (PL) X1 + 6 1) = "3 THEN Y1 = Y1 - 14
```

The length of the note is extracted as the second and third characters (*LN$*) and this is converted to a number by taking the *Value*

```
500 LN$ = MID$ (PA$ (PL) X1 + 3,2)
510 LN = VAL (LN$)
```

Now we divide the actual note length by 4 to *Goto* the routines to actually *Put* the notes These are very similar to those described before

```
520 ON (LN/4) GOTO 540 550 560 570
530 GOTO 580
540 PUT (X2 3 Y1 8) - (X2 + 3 Y1 + 3) S6 AND GOTO 580
550 IF N1 < 7 THEN PUT (X2 3 Y1 - 10) - (X2 + 3 Y1 + 3) M1 AND GOTO 580 ELSE PUT (X2 - 3 Y1 - 3) - (X2 + 3 Y1 + 10) M2 AND GOTO 580
560 IF N1 < 7 THEN PUT (X2 - 3 Y1 - 10) - (X2 + 3 Y1 + 3) C1 AND GOTO 580 ELSE PUT (X2 - 3 Y1 - 3) - (X2 + 3 Y1 + 10) C2 AND GOTO 580
570 IF N1 < 7 THEN PUT (X2 - 3 Y1 - 10) - (X2 + 8 Y1 + 3), Q1 AND GOTO 580 ELSE PUT (X2 - 3 Y1 - 3) (X2 + 5 Y1 + 10) Q2 AND GOTO 580
```

If the character is ' # ' or ' - ' then the sign is *Put* in the appropriate position

```
580 IF MID$ (PA$ (PL) X1 + 5 1) = # THEN PUT (X2- 11 Y1 3) (X2 4 Y1 + 3) SH PSET
590 IF MID$ (PA$ (PL) X1 + 6 1) =    THEN PUT (X2 7, Y1 - 7) (X2 3 Y1 + 3) FL AND
```

The left/right co-ordinate (X2) is incremented by 20 and the next note taken

```
600 X2 = X2 + 20 NEXT X1 PL RETURN
```

"S" – save/load

"S leads to a save/load routine which allows you to *Save* the strings on tape as ASCII files and re*Load* them to recreate both sound and graphics After *Saveing* the cursor is returned to the top of the hi-res screen

```
190 IF A$ = S" THEN 610
610 CLS PRINT@228 " INPUT DO YOU WISH TO LOAD OR SAVE Z$
620 IF LEFT$ (Z$ 1) = L THEN 660 ELSE IF LEFT$ (Z$ 1)< >"S" THEN SCREEN 1 0 GOTO 20
630 INPUT FILE NAME NA$ OPEN O #-1 NA$
640 FOR LI = 1 TO 4 PRINT#-1 PA$ (LI) NEXT LI CLOSE #-1
650 LI = 1 Y = 48 X = 48 NO = 7 GOTO 20
```

After *Loading* the cursor position is set to the top and the *Play* routine automatically called

```
660 INPUT FILE NAME" NA$ OPEN I #-1 NA$
670 FOR LI = 1 TO 4 INPUT#-1 PA$ (LI) NEXT LI CLOSE#-1
680 LI = 1 Y = 48 X = 48 NO = 7 A$ = "F" GOTO 180
```

Any other key will fall through to line 200 and return to 20

```
200 GOTO 20
```

This is an extract from *Advanced Sound and Graphics for the Dragon Computer* by Keith and Steven Brain, published by Sunshine Books

With one voice

Pete Gerrard looks at the sound capabilities hidden inside the Sid chip

The Commodore 64 has a remarkably gifted sound capability, courtesy of the 6581 Sid chip. In this week's article, we'll merely outline the various bytes that you need to play with in order to produce the best sound results. Next week, we'll concentrate more on the technical side of things.

Sid can control three voices, each one having a practical octave range of eight octaves. Unfortunately, we don't have separate volume controls over each voice but have to change them all at the same time. For each voice we have control over four waveforms, namely, triangle, sawtooth, variable pulse and noise.

Our three envelope generators combined with ring modulation, programmable filters and the rest, give Sid the same sort of capabilities as many a more expensive dedicated synthesiser. For now, let's find out which sections of memory control all this.

A look at the memory maps for the Commodore 64 reveal that the Sid chip occupies memory locations *54272* to *54300*. Obviously, it takes up a bit more room than that, but those are the locations that we are concerned with.

As with sprites and graphics, we'll adopt the technique of setting a variable equal to the value of the base location (*54272*), and work our way up from there. The following table shows what each of the 28 usable bytes does.

We'll only go into more detail for voice 1, but the same applies to all three voices.

Byte	Description	
04	Control Waveform Register	
	Bit	Controls
	0	Gate
	1	Synchronisation
	2	Ring Modulation
	3	Testing!
	4	Triangular Waveform
	5	Sawtooth Waveform
	6	Pulse Waveform
	7	White noise waveform
05	Attack and Decay properties	
	Bit	Controls
	0-3	Decay rate
	4-7	Attack Rate
06	Sustain and Release properties	
	Bit	Controls
	0-3	Release rate
	4-7	Sustain rate

Setting the appropriate bit(s) thus can turn off and on a number of different features for each voice.

The Sid chip comes equipped with three voices and these can all be independently controlled to produce a variety of effects. The waveform for each of them can be changed using the appropriate register, and each voice can independently mimic a wide variety of musical instruments. In order to do that, we have to adjust a variety of settings, and we'll start by looking at Attack and Decay, Sustain and Release, collectively known as *Adsr*.

These settings measure the length of time it takes a note to come to its maximum volume, the time taken to go to total silence again, and the length of time for which it will maintain its maximum volume before letting go again. The following table in figure 2 shows the various settings for *Asdr*.

The values in figure 2 are combined in the following way. If, for voice one, we *Poke 54277* with 16, we'd have the lowest attack rate, and no decay. *Poking* it with 20 would give us the same attack rate, but this time a medium decay, as 20 is a combination of the settings for 16 and 4. *Poking 54272* with 72 would give us a medium attack and a high decay, and so on.

Sustain/Releases works in exactly the same way. *Poking 54278* with 40 would give us a low sustain and a high release, as 40 is a combination of 32 (low sustain) and 8 (high release).

Before even playing a note, we've got to know how to turn the voices on, and a look at the earlier table will show us that to set the volume we need to *Poke 54296*, and we can use any number from 0 (silence) through to 15 (maximum volume).

Selecting the waveform for voice one is achieved by altering location *54276* — the usual four values that are put in there are:

17	gives us a triangle waveform
33	gives us a sawtooth waveform
65	gives us a pulse waveform
129	generates white noise

All we need to know now is the actual

Figure 1

note that we want to play This is done by *Poking* locations *54273* and *54272* for voice one with the high and low frequencies of the note to be played

To calculate *HF* and *LF* you need to take the frequency of the note in hertz For example middle *C* has a frequency of 261 63Hz Take the integer of this and divide it by 0 05961 This gives a value of *F* say (in this case 4389 02864) Dividing *F* by 256 gives us the number 17 1446433, and taking the integer of this (ie 17) gives us a value for *HF*

LF is then found by taking the decimal part of the number ie 0 1446433 multiplying it by 256 and taking the result away from 256 Phew! Let s play a note

If by the way you think that we re going to a lot of trouble to play a single note you re absolutely right but when it comes to composing music most of these registers only have to be altered once though a couple of them will need constant changing So, here goes

```
10 S = 54272
20 POKE S + 24 15 REM SET VOLUME TO HIGH-
   EST LEVEL
30 POKE S + 5 34 REM LOW ATTACK LOW
   DECAY
40 POKE S + 6 130 REM HIGH SUSTAIN MEDIUM
   RELEASE
50 POKE S + 1 45 POKE S 169
60 REM HI FREQ AND LO-FREQ FOR NOTE F
   FROM FIFTH OCTAVE
70 POKE S + 4 33. REM A SAWTOOTH WAVE-
   FORM
80 FOR I = 1 TO 500 NEXT REM WAIT A BIT
90 FOR I = 0 TO 24 POKE S + I 0 NEXT REM
   TURN IT ALL OFF
```

A masterpiece, eh? But its not too difficult to extend all of this to start producing simple tunes Next week, we'll start exploring in a little more detail ■



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Four in a row

Robert Crook *presents a micro version of the game* Connect 4 *for model A or B*

This is a computerised version of the game *Connect 4*. The object of the game is to get four of your counters in a line, either vertically, horizontally or diagonally, by placing your counters on top of other ones. The program fits into 8K and is suitable for model A or B.

You must imagine that the grid drawn by the computer is vertically upright, therefore any counter dropped into the slots will travel to the lowest possible position.

Notes

60-160	Sets up array and variables. Request if you want to go first
170	Selects searching value from data statement
180-510	Main repeat — until loop. Searches for the move
540-1000	Procedure move
540-810	All the positions laid down here are bad positions for the computer to be in ie

A B C D E F G H

In this position it would be fatal for the computer to move to C0. Lines 540-810 check for similar positions and end the procedure before making a move if they find them

810-930	Changes numerical position of computer's counter in array to an alphanumeric one
980	Changes value so that the "X" can be placed on the right square of the grid
1010-1160	Procedure User Move. This is where the user inputs his/her move. Checks are then done to see if the move is viable
1170	Data for search
1180	Proc Grid. Draws the Grid
1420-1870	Proc special. This procedure tries to stop the user getting it into double traps. It also helps to make the computer's move less predictable

```
10REM*************************
20REM*      CONNECT-4        *
30REM*        1983           *
40REM*COPYRIGHT(C) R.CROOK   *
50REM*************************
60MODE 5
70PRINT TAB(3,5)"FIRST GO(Y/N)";
80INPUT F$:IF F$="Y" THEN GOTO 90
90DIMA(150):TTC%=0:TTU%=0
100PROCGRID
110IF F$="N"THEN A%=INT((RND(50)+10)/10)+10:V%=0:TI
ME=0:PROCMOVE
120PROCUSERMOVE
130H=0
140TIME=0
150RESTORE
160S%=0
170READ V%:S%=10:Y%=0
180REPEAT
190IF S%-INT(S%/10)*10(10 AND A(S%-1)=0 THEN GOTO 510
200IF H=0 AND V%=2 THEN PROCSPECIAL
210IF S%)67 THEN GOTO 230
220IF A(S%)=0 AND A(S%+10)=0 AND A(S%+40)=0 AND A(S%
+20)=-1 AND A(S%+30)=-1 AND V%=-2 THEN A%=S%+40:PROCMO
VE:IF Y%=0 THEN UNTIL A%=A%:GOTO 120
230IF S%)57 THEN GOTO 290
240IF A(S%)+A(S%+10)+A(S%+20)+A(S%+30)()V% THEN GOTO
290
250IF V%=-4 THEN PROCUSERWIN
260A%=S%
270IF A(A%)=0 AND (A(A%-1)()0 OR A%-INT(A%/10)*10=0)
THENPROCMOVE:IF Y%=0 THEN UNTIL A%=A%:GOTO 120
280A%=A%+10:IF A%(S%+40 THEN GOTO 270
290IF S%-INT(S%/10)*10)4 THEN GOTO 350
300IF A(S%)+A(S%+1)+A(S%+2)+A(S%+3)()V% THEN GOTO 3
50
310IF V%=-4 THEN PROCUSERWIN
320A%=S%
330IF A(A%)=0 AND (A%-(INT(A%/10)*10)=0 OR A(A%-1)()
0) THEN PROCMOVE:IF Y%=0 THEN UNTILA%=A%:GOTO 120
340A%=A%+1:IF A%(S%+4 THEN GOTO 330
350IF S%)59 OR S%-INT(S%/10)*10)4 THEN GOTO 430
360IF A(S%)+A(S%+11)+A(S%+22)+A(S%+33)()V%THEN GOTO
430
370IF V%=-4 THEN PROCUSERWIN
380D%=0
390A%=S%
400IF A(A%+D%)=0 AND (A(A%+D%-1)()0 OR (A%+D%)-INT(
(A%+D%)/10)*10=0) THEN A%=A%+D%:PROCMOVE:IF Y%=0 THEN
UNTIL A%=A%:GOTO 120
410D%=D%+1
420A%=A%+10:IF A%(S%+40 THEN GOTO 400
430IF S%)80 OR S%-INT(S%/10)*10)4 THEN GOTO 510
440IF A(S%)+A(S%-9)+A(S%-18)+A(S%-27)()V% THEN GOTO
510
450IF V%=-4 THEN PROCUSERWIN
460D%=0
470A%=S%
480IF A(A%+D%)=0 AND (A(A%+D%-1)()0 OR (A%+D%)-INT((
A%+D%)/10)*10=0) THEN A%=A%+D%:PROCMOVE:IF Y%=0 THEN
UNTIL A%=A%:GOTO 120
490D%=D%+1
500A%=A%-10:IF A%)S%-40 THEN GOTO 480
510S%=S%+1:UNTIL S%=87
520Y%=Y%+1:IF Y%(7 THEN GOTO 170
530PRINTTAB(0,3)"I CANT WIN.WELL DONE":END
540DEFPROCMOVE
550IFA%-INT(A%/10)*10()0 AND A(A%-1)=0 THEN GOTO
1410
560 IFA%-INT(A%/10)*10)7 THEN GOTO 1410
570IF ABS(V%)=3 THEN GOTO 820
580IF A%)53 THEN GOTO 600
590IF A(A%+12)+A(A%+23)+A(A%+34)=-3 THEN GOTO 1410
600IF A%(36 THEN GOTO 620
610IF A(A%-8)+A(A%-17)+A(A%-26)=-3 THEN GOTO 1410
620IF A%)56 THEN GOTO 640
630IF A(A%+11)+A(A%+21)+A(A%+31)=-3 THEN GOTO 1410
640IF A%(39 THEN GOTO 660
650IF A(A%-9)+A(A%-19)+A(A%-29)=-3 THEN GOTO 1410
660IF A%(29 THEN GOTO 680
670IF A(A%+11)=-1 AND A(A%-8)=-1 AND A(A%-19)=-1
THEN GOTO 1410
680IF A%)56 OR A%(19 THEN GOTO 700
690IF A(A%-9)=-1 AND A(A%+11)=-1 AND A(A%+21)=-1
THEN GOTO 1410
700IF A%)58 THEN GOTO 720
710 IFA(A%+10)=-1 AND A(A%+19)=-1 AND A(A%+28)=-1
THEN GOTO 1410
720IF A%(42 THEN GOTO 740
730IFA(A%-10)=-1 AND A(A%-21)=-1 AND A(A%-32)=-1
THEN GOTO 1410
740IF A%)60 THEN GOTO 760
750IF A(A%+19)+A(A%+10)+A(A%-8)=-3 THEN GOTO 1410
760IF A%(27 THEN GOTO 780
770IF A(A%+10)+A(A%-8)+A(A%-17)=-3THEN GOTO 1410
780IF A%(31 THEN GOTO 800
790IF A(A%-21)+A(A%-10)+A(A%+12)=-3 THEN GOTO 1410
800IF A%(20 THEN GOTO 820
810IF A(A%-10)+A(A%+12)+A(A%+23)=-3 THEN GOTO 1410
820Y%=0
830P%=INT(A%/10)
840IFP%=1 THEN Q$="A"
850IFP%=2 THEN Q$="B"
860IFP%=3 THEN Q$="C"
870IFP%=4 THEN Q$="D"
880IFP%=5 THEN Q$="E"
890IFP%=6 THEN Q$="F"
900IFP%=7 THEN Q$="G"
910IFP%=8 THEN Q$="H"
920PRINT TAB(1,25)"
930L%=A%-INT(A%/10)*10+1
935COLOUR1
940PRINT TAB(1,25)"MY MOVE,TO ";Q$;L%:TTC%=TTC%+TI
ME/100:FOR Z=1 TO 10000:NEXT
950PRINT TAB(1,30)"MY TIME=";INT(TTC%)
955COLOUR2
960I%=INT(A%/10)*10/5:D%=22-(2*L%)
970PRINTTAB(I%,D%)"X"
980IFV%=3 THEN ENVELOPE 2,1,1,1,1,10,10,10,3,0,0,
-1,126,126:SOUND 1,2,150,100:PRINT TAB(4,3)"I HAVE
WON":END
990A(A%)=1
1000ENDPROC
1010DEFPROCUSERMOVE
1020SOUND1,-15,100,5
1025PRINT TAB(1,25)"
1026COLOUR1
1030PRINTTAB(1,25)"YOUR MOVE =";
1040TIME=0
1050INPUT W$:IF W$=""THEN GOTO 1030 ELSE TTU%=TTU%+
TIME/100:PRINT TAB(1,27)"YOUR TIME=";INT(TTU%)
```

```
1055COLOUR2
1060A=2:B=4:C=6:D=8:E=10:F=12:G=14:H=16
1070I%=EVAL(MID$(W$,1,1))
1080D%=EVAL(MID$(W$,2,2))
1090D%=22-D%+2:R%=D%
1100A=10:B=20:C=30:D=40:E=50:F=60:G=70:H=80
1110W%=EVAL(MID$(W$,1,1))+EVAL(MID$(W$,2,2))-1
1120IF A(W%)<>0 THEN PRINTTAB(1,25)"SORRY,NOT EMPTY
":FOR U%=1 TO 3000:NEXT:PRINT TAB(1,25)"
":GOTO 1050
1130IFW%-INT(W%/10)*10<>0 AND A(W%-1)=0 THEN PRINT
TAB(1,25)"NOTHING BELOW ":FOR U%=1 TO 3000:NEXT:PRIN
T TAB(1,25)"                  ":GOTO 1030
1140PRINT TAB(I%,R%)"O"
1150A(W%)=-1
1160ENDPROC
1170DATA -4,3,-3,-2,2,1,-1
1180DEFPROCGRID
1190VDU 23 240 255,255,255,255,255,255,255,255
1200GCOL0,128:CLS:COLOUR 2:VDU 19,3,2,0,0,0
1210FOR A%=1 TO 17 STEP 2
1220FOR B%=5 TO 21
1230PRINT TAB(A%,B%)CHR$(240)
1240NEXT B%:NEXT A%
1250FOR A%=5 TO 21 STEP 2
1260FOR B%=1 TO 17
1270PRINT TAB(B%,A%)CHR$(240)
1280NEXT B%:NEXT A%
1300FOR W%=6 TO 20 STEP 2
1310PRINT TAB(0,W%)19-(W%/2-2)
1320NEXT W%
1340PRINT TAB(2,23)"A B C D E F G H"
1350COLOUR3
1360PRINT TAB(5,1)"CONNECT-4"
1370ENDPROC
1380DEFPROCUSERWIN
1390PRINT TAB(1,3)"YOU WIN, I SUPPOSE" :FOR F%=1 TO
100:SOUND 0,-15,F%,1:NEXT
1400END
1410Y=0:ENDPROC
1420DEFPROCSPECIAL
1430LOCAL A%
1440FOR A%=10TO 87
1450S%=A%:X%=A%
1460REM**STOP TRIANGLE***
1470IF S%<20 THEN GOTO 1500
1480IF A(S%-10)+A(S%-20)+A(S%-9)+A(S%-18)<-1 THEN G
=1:GOSUB 1880:IF G=1 THEN PROCMOVE:IF Y%=0 THEN GOTO
120
1490A%=X%
1500IF S%>68 THEN GOTO 1530
1510IF A(S%+10)+A(S%+20)+A(S%+11)+A(S%+22)<-1 THEN
G=1:GOSUB 1930:IF G=1 THEN PROCMOVE:IF Y%=0 THEN GOT
O 120
1520A%=X%
1530IF S%<32 THEN GOTO 1560
1540IF A(S%-10)+A(S%-20)+A(S%-11)+A(S%-22)<-1 THEN
G=1:GOSUB 1980:IF G=1 THEN PROCMOVE:IF Y%=0 THEN GOT
O 120
1550A%=X%
1560IF S%>67 THEN GOTO 1590
1570IF A(S%+10)+A(S%+20)+A(S%+9)+A(S%+18)<-1 THEN G
=1:GOSUB 2030:IF G=1 THEN PROCMOVE:IF Y%=0 THEN GOTO
120
1580A%=X%
1590REM***2 DIAGS***
1600IF S%>69 THEN GOTO 1630
1610IF A(S%-1)+A(S%+9)+A(S%+8)+A(S%+18)+A(S%+17)<-2
THEN G=1:GOSUB 2080:IF G=1 THEN PROCMOVE:IF Y%=0 THE
N GOTO 120
1620A%=X%
1630IF S%<33 THEN GOTO 1650
1640IF A(S%-1)+A(S%-11)+A(S%-12)+A(S%-22)+A(S%-23)
<-2 THEN G=1:GOSUB 2140:IF G=1 THEN PROCMOVE:IF Y%=0
THEN GOTO 120
1650A%=X%
1660REM***RIGHT ANGLE ATTACK***
1670IF S%<30 THEN GOTO 1700
1680IF A(S%-1)+A(S%-2)+A(S%-10)+A(S%-20)<-2 THEN G=
1:GOSUB 2200:IF G=1 THEN PROCMOVE:IF Y%=0 THEN GOTO
120
1690A%=X%
1700IF S%>67 THEN GOTO 1730
1710IF A(S%-1)+A(S%-2)+A(S%+10)+A(S%+20)<-2 THEN G=
1:GOSUB 2250:IF G=1 THEN PROCMOVE:IF Y%=0 THEN GOTO
120
1720A%=X%
1730IF S%>48 THEN GOTO 1760
1740IF A(S%+10)+A(S%+20)+A(S%+25)+A(S%+30)<-2 THEN
G=1:GOSUB 2300:IF G=1 THEN PROCMOVE:IF Y%=0 THEN GOT
O 120
1750A%=X%
1760IF S%<52 THEN GOTO 1790
1770IF A(S%-10)+A(S%-20)+A(S%-31)+A(S%-42)<-2 THEN
G=1:GOSUB 2350:IF G=1 THEN PROCMOVE:IF Y%=0 THEN GOT
O 120
1780A%=X%
1790IF S%>45 THEN GOTO 1820
1800IF A(S%+10)+A(S%+20)+A(S%+31)+A(S%+42)<-2 THEN
G=1:GOSUB 2400:IF G=1 THEN PROCMOVE:IF Y%=0 THEN GOT
O 120
1810A%=X%
1820IF S%<48 THEN GOTO 1850
1830IF A(S%-10)+A(S%-20)+A(S%-25)+A(S%-38)<-2 THEN
G=1:GOSUB 2450:IF G=1 THEN PROCMOVE:IF Y%=0 THEN GOT
O 120
1840A%=X%
1850NEXT A%
1860H=1
1870ENDPROC
1880IF A(S%-10)=0 THEN A%=S%-10:RETURN
1890IF A(S%-20)=0 THEN A%=S%-20:RETURN
1900IF A(S%-9)=0 THEN A%=S%-9:RETURN
1910IF A(S%-18)=0 THEN A%=S%-18:RETURN
1920G=0:RETURN
1930IF A(S%+10)=0 THEN A%=S%+10:RETURN
1940IF A(S%+20)=0 THEN A%=S%+20:RETURN
1950IF A(S%+11)=0 THEN A%=S%+11:RETURN
1960IF A(S%+22)=0 THEN A%=S%+22:RETURN
1970G=0:RETURN
1980IF A(S%-10)=0 THEN A%=S%-10:RETURN
1990IF A(S%-20)=0 THEN A%=S%-20:RETURN
2000IF A(S%-11)=0 THEN A%=S%-11:RETURN
2010IF A(S%-22)=0 THEN A%=S%-22:RETURN
2020G=0:RETURN
2030IF A(S%+10)=0 THEN A%=S%+10:RETURN
2040IF A(S%+20)=0 THEN A%=S%+20:RETURN
2050IF A(S%+9)=0 THEN A%=S%+9:RETURN
2060IF A(S%+18)=0 THEN A%=S%+18:RETURN
2070G=0:RETURN
2080IF A(S%-1)=0 THEN A%=S%-1:RETURN
2090IF A(S%+9)=0 THEN A%=S%+9:RETURN
2100IF A(S%+8)=0 THEN A%=S%+8:RETURN
2110IF A(S%+18)=0 THEN A%=S%+18:RETURN
2120IF A(S%+17)=0 THEN A%=S%+17:RETURN
2130G=0:RETURN
2140IF A(S%-1)=0 THEN A%=S%-1:RETURN
2150IF A(S%-11)=0 THEN A%=S%-11:RETURN
2160IF A(S%-12)=0 THEN A%=S%-12:RETURN
2170IF A(S%-22)=0 THEN A%=S%-22:RETURN
2180IF A(S%-23)=0 THEN A%=S%-23:RETURN
2190G=0:RETURN
2200IF A(S%-1)=0 THEN A%=S%-1:RETURN
2210IF A(S%-2)=0 THEN A%=S%-2:RETURN
2220IF A(S%-10)=0 THEN A%=S%-10:RETURN
2230IF A(S%-20)=0 THEN A%=S%-20:RETURN
2240G=0:RETURN
2250IF A(S%-1)=0 THEN A%=S%-1:RETURN
2260IF A(S%-2)=0 THEN A%=S%-2:RETURN
2270IF A(S%+10)=0 THEN A%=S%+10:RETURN
2280IF A(S%+20)=0 THEN A%=S%+20:RETURN
2290G=0:RETURN
2300IF A(S%+10)=0 THEN A%=S%+10:RETURN
2310IF A(S%+20)=0 THEN A%=S%+20:RETURN
2320IF A(S%+25)=0 THEN A%=S%+25:RETURN
2330IF A(S%+30)=0 THEN A%=S%+30:RETURN
2340G=0:RETURN
2350IF A(S%-10)=0 THEN A%=S%-10:RETURN
2360IF A(S%-20)=0 THEN A%=S%-20:RETURN
2370IF A(S%-31)=0 THEN A%=S%-31:RETURN
2380IF A(S%-42)=0 THEN A%=S%-42:RETURN
2390G=0:RETURN
2400IF A(S%+10)=0 THEN A%=S%+10:RETURN
2410IF A(S%+20)=0 THEN A%=S%+20:RETURN
2420IF A(S%+31)=0 THEN A%=S%+31:RETURN
2430IF A(S%+42)=0 THEN A%=S%+42:RETURN
2440G=0:RETURN
2450IF A(S%-10)=0 THEN A%=S%-10:RETURN
2460IF A(S%-20)=0 THEN A%=S%-20:RETURN
2470IF A(S%-25)=0 THEN A%=S%-25:RETURN
2480IF A(S%-38)=0 THEN A%=S%-38:RETURN
2490G=0:RETURN
```


fantasy
SOFTWARE

The ultimate Crossword



The puzzle that needs a computer

Allen present the ultimate in word puzzles – 30 integrated crosswords which form a cube

All locations of this 3 dimensional puzzle are contained in the computer programme and you can complete any part you wish using the display on your TV and computer keyboard. Understanding all the relationships between the crosswords is not possible without the computer but as you proceed you will discover new routes to help achieve the solution.

Features. Solution Store, Instant Display, Anagram Function, Character Location in memory.

This is a tough puzzle with a degree of difficulty – it's the ultimate but it's not impossible. Full instructions are included with the programme.

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CHOOSING A HOME MICRO

WARNING

Choosing a home micro can be a daunting task to the newcomer, and with an ever increasing number of micros emerging on the market, even up-grading, say, from a ZX81 can be a risky and expensive exercise if the wrong decision is made. It is important to look at the real facts and specifications, and check exactly what you get for your money before choosing your micro-computer system.

THE PITFALLS

"DON'T LET THE ADD ONS ADD UP"

A number of large companies are offering packages that seem to be good value and low cost.
These offers usually have a hidden sting inasmuch as the essential accessories such as connection leads peripherals and software often carry very high cost premiums e.g. software for low cost hardware usually costs between £29 and £49 for a ROM cartridge!!

CHECK THE QUALITY OF THE PRODUCT.

Raw materials are now an area where corners can be cut and shoddy workmanship during building can effect the up-time of your unit. Areas to watch out for are unreliable edge connectors corrosion and poor quality P.C.B.s. Low quality components and bad design will seriously effect the reliability of the end product, and can lead to false economy.

DON'T BUY A GAMES MACHINE

Unless you want just games and nothing else! With a games computer you are limited.
Some computers however have the advantage of both games facility plus the whole world of computing to explore as your interest and skills develop. A real computer system will allow you to expand your knowledge of the Hi Technology world and help earn its keep with its added uses in the field of education communication and home business use.

SOFTWARE

Make sure the system you choose has a growing library of support software to enable you to realize the full potential of your machine.

KEY POINTS TO LOOK FOR

● High Resolution Colour

In general most home computers have a poor graphics resolution (or detail). Check on the vertical and horizontal resolution in graphic mode and multiply the two numbers together. If the result is less than 35 000 then the graphics can hardly be considered high resolution. Without high resolution graphics displays such as those used in games tend to be "Chunky" in appearance.

● High Quality Sound

Some computers claim to provide a sound channel when in reality all that can be found inside the computer is a small buzzer controlled by electronic pulses. At the very least a sound facility should provide more than one channel and a noise channel as well (for gun shot effects in games for example). The best systems also provide envelope control of the sound channels to produce very sophisticated effects, very important for generating music. Also look for the ability to connect to external amplifiers.

● Keyboard

For accurate entry of programs and data into a computer it is important that the keyboard has a good tactile feel in operation. Coupled with acoustic feedback the user is fully aware when the computer has accepted his/her actions. Also of importance in a keyboard's layout. A standard computer keyboard layout will familiarise the user with the vast majority of computers used in the world of business and professional applications, very important if the purpose of purchasing a computer is educational.

● RAM

One of the most important features of a computer is the amount of RAM or memory included. In general the more powerful and exciting a computer program is the more RAM it requires. But take care all computers are advertised quoting the total RAM used in the system. Computers use up a great deal of their own RAM for storing essential data and particularly in supporting the graphics display and the CPU. If it is less than 32K think again, is it enough?

● Computer Language

It is too dificult to program a computer in its own binary language so high level languages are used, the most popular being BASIC. However there are a number of BASICs, some being very different from the rest. A de facto standard in the computer industry is Microsoft BASIC. Learn this one and you will be able to program in the majority of computer BASICs, such an important point if a home computer is to be used to educate your children to face the technology of the future.

● Expansion

As your interest and knowledge of computing grows, you will need a computer system that will grow with you, able to accommodate Printers, Disk drives, Joysticks, Communications Modem, and Colour Monitor as well as produce Hi Fi sound effects.

● Software

The computer you choose should have a growing selection of utility software to make the most of its capability.
Remember computing is here to stay. You can't learn to compute on a toy or a device which does not behave like a real computer.
In short, look out for a computer which offers all the points above and you will be sure of getting the best value for money.

Choosing the [illegible] system [illegible] money away. Check full spec [illegible] peripherals and software prices before you buy. Preferably choose a Real computer system that can expand to meet your needs.

To find out which company offers you the right choice, with:-

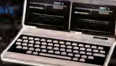
- **Good value, high specification, quality micros.**
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- **Comprehensive and growing range of software**

TURNOVER... →

The Growing System

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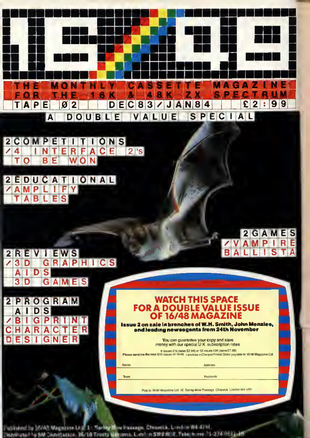
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Chemical attraction

***Mark Lawrence** presents a program to help chemistry students learn about the periodic table*

This program was written for students who are studying chemistry, either at 'A or 'O level.

The program simply draws the periodic table, with the *F* block placed below as it was impossible to fit it in the right position on the Spectrum's 32-column screen. For this reason, I have also used user definable graphics, and left out the noble gases neon, argon, krypton, zenon and radon. These would usually be placed in group 8 on the right alongside the halogens group 7.

For anybody who does not know what the periodic table is, it is a table in which all the chemical elements are arranged in order of their atomic number and also in groups which classify them according to their properties. For instance, lithium, symbol *Li* is the third element after hydrogen, *H* and helium, *He* and is in the same group as sodium, *Na*, potassium, *K*, rubidium, *Rb*, caesium, *Cs*, and francium, *Fr*.

The most important step in developing the periodic table came in 1869, when a Russian chemist, Dmitri Ivanovich Mendeléeff (pronounced Mendelev), studied the relationship between the atomic weights of the elements and their properties. He was led to the conclusion that "the properties of the elements are in periodic dependence on their atomic weights", a conclusion this had been hinted at by an English chemist, John Newlands. From this conclusion Mendeléeff was able to construct his periodic table made up of the 60 elements known to him at the time.

Below is the table Mendeléeff laid out.

As you can see, it differs from the modern-day table, but there are similarities. And it should be remembered that when Mendeléeff presented his table there were still a great many elements to be discovered.

The program itself is very simple. It prints the elements in the order required and then constructs a table around them using *Plot* and *Draw*. Because of its simplicity it should be easy to develop it into a more sophisticated program. Possible enhancements would be to blank out sections of the table and attempt to fill them in or have the computer ask you to list a particular group.

I hope this program will be of some use to anyone studying chemistry. It helped me pass my 'A level.

	I		II		III		IV		V		VI		VII		VIII		
Period 1	H																
Period 2	Li		Be		B		C		N		O		F				
Period 3	Na		Mg		Al		Si		P		S		Cl				
Period 4	K	Cu	Ca	Zn	*	*	Ti	*	V	As	Cr	Se	Mn	Br	Fe	Co	Ni
Period 5	Rb	Ag	Sr	Cd	Y	In	Zr	Sn	Nb	Sb	Mo	Te	*	I	Ru	Rh	Pd

```
  10 INK 0: PAPER 7: CLS : BORDE
R 1: PRINT AT 0,6;"PERIODIC TABL
E": PLOT 47,167: DRAW 113,0
  15 PRINT AT 3,10;"H He"
  20 PRINT AT 5,0;"LiBe
        B C N O F"
  30 PRINT "NaMg
  AlSiP S Cl"
  40 PRINT "K CaScTiV CrMnFeCoNiC
uZnGaGeAsSeBr"
  50 PRINT "RbSrY ZrNbMoTcRuRhPdA
gCdInSnSbTeI"
  60 PRINT "CsBaLaHfTaW ReOsIrPtA
uHgTlPbBiPo"
  70 PRINT "FrRaAcKuHa"
  80 PRINT TAB 2;"F Block"
  90 PRINT TAB 2;"CePrNdPmSmEuG
dTbDyHoErTmYbLu"
 100 PRINT TAB 2;"ThPaU NpPuAmCm
BkCfEsFmMdNoLr"
 110 RESTORE 100
 120 PLOT 0,136
 130 FOR s=1 TO 10
 140 READ d,e
 150 DRAW d,e
 160 NEXT s
 170 DATA 0,-49,79,0,0,8,176,0,0
,40,-72,0,0,-15,-152,0,0,15,-31,
0
 180 RESTORE 200
 190 FOR e=1 TO 16
 200 READ g,f
 210 PLOT g,87+(8 AND e>5): DRAW
0,f
 220 NEXT e
 230 DATA 15,48,31,33,47,33,63,3
3,79,33,95,25,111,25,127,25,143,
25,153,25,167,25,183,25,199,40,2
15,40,221,40,247,40
 240 FOR n=15 TO 239 STEP 16
 250 PLOT n,48: DRAW 0,16
 260 NEXT n
 270 PLOT 15,64: DRAW 224,0
 280 PLOT 15,47: DRAW 224,0
 290 PLOT 79,143: DRAW 32,0: DRA
W 0,9: DRAW -32,0: DRAW 0,-9: PL
OT 95,143: DRAW 0,8
 380 PRINT AT 4,0; OVER 1;"1 2
              3 4 5 6 7"
 390 PRINT AT 6,5; OVER 1;"Trans
ition Metals"
 400 FOR n=5 TO 10: PRINT PAPER
2;AT n,0; OVER 1;"  ": NEXT n
 410 FOR n=5 TO 10: PRINT PAPER
5;AT n,2; OVER 1;"  ": NEXT n
 420 FOR n=7 TO 9: PRINT PAPER 4
;AT n,4; OVER 1;"  ": NEXT n: PRINT PAPER 4; OV
ER 1;AT 10,4;"  "
 430 FOR n=5 TO 9: PRINT PAPER 3
;AT n,23; OVER 1;"  ": NEXT n
 440 FOR n=5 TO 9: PRINT PAPER 6
;AT n,25; OVER 1;"  ": NEXT n
 450 FOR n=5 TO 9: PRINT PAPER 1
; BRIGHT 1;AT n,27; OVER 1;"  ":
NEXT n
 460 FOR n=5 TO 9: PRINT PAPER 2
; BRIGHT 1;AT n,29; OVER 1;"  ":
NEXT n
 470 FOR n=5 TO 9: PRINT PAPER 3
; BRIGHT 1;AT n,31; OVER 1;" ":
NEXT n
 480 PRINT AT 14,2; PAPER 5; BRI
GHT 1; OVER 1;"                 "
 490 PRINT AT 15,2; PAPER 5; BRI
GHT 1; OVER 1;"                 "
 600 PAUSE 0
 999 STOP
1000 RESTORE 1000
1010 FOR n=32600 TO 32599+48
1020 READ a
1030 POKE n,a
1040 NEXT n
1050 DATA 0,112,84,118,82,68,70,
0,0,0,69,108,85,77,69,0,0,112,81
,113,71,69,71,0,0,48,74,75,122,7
4,75,0,0,112,84,68,68,68,119,0,0
,112,80,103,84,84,116,0
1060 GO TO 10
```

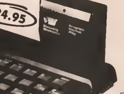
PERIODIC TABLE

F Block

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Open Forum is for you to publish your programs and ideas. Take care that the listings you send in are all bug-free. Your documentation should start with a general description of the program and what it does and then give some detail of how the program is constructed. We will pay the _Program of the Week_ double our new fee of £6 for each program published.

Geometrics

on Spectrum

This program generates a random equation in polar coordinates and then converts these to cartesian coordinates and plots on the screen. In addition each point is stored in an array and beeped in turn to make a tune which is played three times.

As all the figures generated are closed figures the tune is also closed, and it is therefore not possible to perceive the join.

Whilst the tune is playing if "P" is pressed the shape is copied to the Sinclair printer, and the tune played again. If any other key is pressed, the next shape is drawn.

Lines 30 to 140 are the basis of the random generator. They can be added to, and there is plenty of room between 150 and 880. Line 890 is there to trap a homing entry such as "r=0" which is the perfectly valid equation of a point at the origin!

The plotting is perfectly straightforward. There has been no need for error trapping, as the program has been run for quite some time without the plots going off screen, and error trapping would slow up the program.

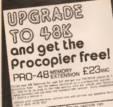
After the figure has been plotted the tune is played. A slight variation has been given to be _Beep_ lengths, to simulate a human player. A trap has been inserted to trap out an invalid _Beep_ call.

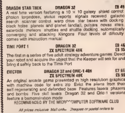
The concept of getting tunes from geometrical shapes is certainly valid as music is only patterns in sound.

PROGRAM OF THE WEEK

```
  1>GO SUB 2000
  5 INK 7: PAPER 1: BORDER 1: CLS
  8 DIM t(65)
 10 LET a=10: LET b=128: LET c=88
 20 LET a$=STR$ (INT (4*RND))
 30 IF RND<ra THEN  LET a$=a$+"+SIN f*SIN f"
 40 IF RND<ra THEN  LET a$=a$+"+COS f*COS f"
 50 IF RND<ra THEN  LET a$=a$+"+COS (f*2)"
 60 IF RND<ra THEN  LET a$=a$+"+SIN (f*2)"
 70 IF RND<ra THEN  LET a$=a$+"+SIN (f*3)"
 80 IF RND<ra THEN  LET a$=a$+"+COS (f*3)"
 90 IF RND<ra THEN  LET a$=a$+"+SIN (f*4)"
100 IF RND<ra THEN  LET a$=a$+"+COS (f*4)"
110 IF RND<ra THEN  LET a$=a$+"+SIN f*SIN f*SIN f"
120 IF RND<ra THEN  LET a$=a$+"+COS f*COS f*COS f"
130 IF RND<ra THEN  LET a$=a$+"+COS f*COS f*COS f*COS f"
140 IF RND<ra THEN  LET a$=a$+"+SIN f*SIN f*SIN f*SIN f"
890 IF LEN a$=1 THEN  GO TO 20
900 PRINT a$: PAUSE 100: CLS
1000 REM
1010 FOR f=0 TO PI*2+.1 STEP .1
1020 LET r=a*VAL (a$): LET t(f*10+1)=r
1025 REM  IF r<10 THEN  LET r=r+5*RND
1030 LET x=b+r*SIN f: LET y=c+r*COS f
1040 IF f=0 THEN  PLOT x,y: GO TO 1060
1050 DRAW x-PEEK 23677,y-PEEK 23678
1060 NEXT f
1070 FOR n=1 TO 3: FOR f=1 TO 64
1080 IF INKEY$="" THEN  BEEP (.05+.05*RND)*(t(f)<=69),t(f)*(t(f)<=69) : NEXT f:
NEXT n
1090 IF INKEY$="p" THEN  COPY : LPRINT a$: GO TO 1070
1100 CLS : GO TO 20
2000 PAPER 2: INK 7: BORDER 4 : CLS
2010 PRINT "GEOMETRIC TUNES"
2020 PRINT "(c) RTL 1983": PRINT
2030 REM This program is available with many others on the Porthtowan combo tape
 issue 2 from West Towan House, Porthtowan, Truro, Cornwall TR4 8AX price £4. (r
educed to owners of issue one as per leaflet)
2040 PRINT "This program generates geometricpatterns and plays their tunes.": PR
INT
2050 PRINT "After the pattern is plotted itstune is played three  times.  Ifyou
press p, then it  is  copiedon your Sinclair printer,and thetune played again.
  Press  anyother key and the  next  patternis produced."
2060 PRINT : PRINT "Press a number from 1 to 5.  Thehigher number gives more com
pli-cated patterns.": PRINT
2070 IF INKEY$="" THEN  GO TO 2070
2080 LET r=CODE (INKEY$)-48: IF r<1 OR r>5 THEN  GO TO 2070
2090 LET ra=r/10: RETURN
```

Geometrics
by John de Rivaz


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Time Trials

on Dragon 32

The object of the game is to guide the space shuttle through the maze in the shortest possible time. You have 5 attempts and the time of each one is printed out at the end of the game. The average is also worked out and shown. You are then told how well you have done.

At the bottom left hand corner of the screen you are told what go you are on. You then have to wait until the word GO is printed in the middle at the bottom of the screen. As soon as this appears the timer starts and the seconds are printed in the bottom left hand corner.

```
10 '*****************************
20 '*******TIME TRIALS**********
30 '*******BY RUSSELL NEWBY******
40 '*****************************
50 N$(0)= BM12,185,H2U6E2R6F2D6G2L6
60 N$(1)= BM10,185,R5NR5U10G3
70 N$(2)= BM10,185,NR10U3E2R6U3H2L6
80 N$(3)= BM 12,185,NH2R6E2U1H2NL4E2U1H2
L6G2
90 N$(4)= BM10,185,U5NR2NL5U5G5
100 N$(5)= BM12,185,NH2R6E2U3H2L8U3R10'
110 N$(6)= BM12,185,NH2R6E2U3H2L8ND5U2E1
R8
120 N$(7)= BM15,185,U5E5L10
130 N$(8)= BM12,185,NH2R6E2U1H2L6G2D1U1
E2H2U1E2R6F2D1G2
140 N$(9)= BM12,185,R6E2U3L8H2U1E2R6F2D3

150 DIM G(12)
160 U=1
170 FOR X=1 TO220 STEP 20
180 G(U)=X
190 U=U+1
200 NEXT
210 DIM I(15,13)
220 DIM T(15,5)
230 DIM S(15,9)
240 Z=1
250 T1=0
260 PMODE 3,1 SCREEN1 0
270 PCLS
280 LINE(0,166)-(255,166),PSET
290 DRAW C3
300 FOR X=1 TO 100 STEP 20
310 DRAW BM+240,+0,C2'+N$(2)
320 LINE(0,X)-(255,X),PSET B
330 NEXT
340 X=20
350 U=0
360 FOR X1=1TO160 STEP20
370 X2 G((RND(8)+1))
380 G2(U)=X2-5
390 LINE(G2(U),X1) (G2(U)+24,X1),PRESET
400 LINE(G2(U),X1)-(G2(U),X1+2),PSET
410 LINE(G2(U)+24,X1)-(G2(U)+24,X1+2),PS
ET
420 U=U-1
430 NEXT
440 U=1
450 DRAW' BM3,160;S4;C2,R15H5NL5U4L5D4G5
'
460 PAINT(8,156),2,2
470 GET (3,151)-(17,160),S
480 DRAW BM3,160,S4,C2,R5C4G2F2E2H2C2R5
C4G2F2E2H2C2R5
490 GET (3,160)-(17,165),T
500 X=G((RND(8)+1))
510 Y=151
520 PUT (3,151)-(16,164),1
530 FOR Q=1TO2000 NEXT Q
540 DRAW BM100,190,C4NL5NR5D5L10U12R10D2
 BM+12,-2,G2D8F2R8E2U8H2L8
550 TIMER=0
560 A=JOYSTK(0)
570 T3=INT(TIMER/50)
580 IF T3>9AND T3<19   THEN T3=T3-10
590 IF T3>28 THEN460
600 IF T3>=19 THEN T3=T3-19
610 PUT(10,175)-(20,185),1
620 DRAW  C3 +N$(T3)
630 IF X<10 THEN X=X+20
640 IF X>235 THEN X=X-20
650 PUT(X,Y)-(X+15,Y+5),S
660 P=PEEK(65280)
670 IF P=126 OR P=254 THEN GOSUB 730
680 IF A>10 AND A<50 THEN560
690 IF A>50 THEN PUT(X,Y)-(X+15,Y+5),I X
=X+20  GOTO560
700 IF A<10 THENPUT(X,Y)-(X+15,Y+9),I  X
=X-20 GOTO560
710 GOTO560
720 GOTO720
730 IF X<G2(U) OR X+15>G2(U)+24 THEN RET
URN
740 IF U=8 THEN 860
750 PUT (X,Y)-(X+15,Y+8),1
760 Y=Y-21
770 PUT (X,Y)-(X+15,Y+8),S
780 PUT(X,Y+9)-(X+15,Y+13),T
790 FOR F=1TO5
800 SOUND F*20,1
810 NEXT
820 FOR F=1TO50 NEXT
830 PUT(X,Y+9)-(X+15,Y+13),1
840 U=U+1
850 RETURN
860 T2(Z)=TIMER/50
870 Z=Z+1
880 IF Z>5 THEN890 ELSE 250
890 CLS5
900 PRINTSTRING$(32, * )
910 FOR X=1 TO 5
920 PRINT@(X 1)*32, TIME ON GO  ,X,
,"PRINTUSING"##.###",T2(X), PRINT  SECS

930 T1=T1+T2(X)
940 NEXT X
950 T1=T1/5
960 PRINT PRINTSTRING$(32, * ) PRINT THE
 AVERAGE OF THE 5 GOES IS  PRINTUSING ##
.### ,T1
970 IF T1<9 THEN PRINTTAB(10), EXCELLENT

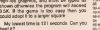
980 IF T1>=9 AND T1<10 THEN PRINTTAB(10)
, VERY GOOD
990 IF T1>=10 AND T1<11 THEN PRINTTAB(10
), GOOD  ELSE IF T1>=11 THEN PRINTTAB(10
), POOR'
1000 PRINT STRING$(32, * )
1010 PRINT PRESS SPACE BAR FOR ANOTHER G
O
1020 PRINT ELSE PRESS N
1030 IF PEEK(345)=223 THEN GOTO 240
1040 IF PEEK(344)=247 THEN END
1050 GOTO1030
```

Time Trials
by Russell Newby

Number Puzzler

on Vic20

This program will run on an unexpanded Vic20. It resembles an old hand-held favourite in which you must slide numbers into the correct order. The game uses high-res graphics, and must be typed as shown otherwise the program will exceed 3.5K. If the game is too easy then you could adapt it to a larger square.



My lowest time is 121 seconds. Can you beat it?



Program notes

1-34	Initialisation
35	Input number
39-48	Check for invalid data
49-55	Check if game is complete
56-63	End game
64	Colour routine
65-94	Hi-res graphics
95-110	Instructions.

```
1 PRINT"□" POKE36879,255 LT=3600
2 GOTO65
3 IFLT<3600THEN6
4 POKE36879,255 GOSUB95
5 DEF FNA(X)=INT(RND(1)*X)+1 DIMN(25)
6 S=0
7 PRINT"□"
8 PRINT"■■■NUMBER PUZZLER"
9 PRINT"■■■■■■■■■■LAINC"
10 FORI=8TO14 POKE7680+22*5+I,0 NEXT
11 FORI=8TO14 POKE7680+22*5+1+30720,0 NEXT
12 FORI=5TO11 POKE7680+22*I+2,0 NEXT
13 FORI=5TO11 POKE7680+22*I+1+30720,0 NEXT
14 FORI=2TO14 POKE7680+22*11+1,0 NEXT
15 FORI=8TO14 POKE7680+22*11+1+30720,0 NEXT
16 FORI=5TO11 POKE7680+22*I+14,0 NEXT
17 FORI=5TO11 POKE7680+22*I+14+30720,0 NEXT
18 FORI=1TO24 N(I)=1 NEXT GOTO28
19 S=S+1
20 M=FNA(24)
21 FORI=1TOS
22 IFN(I)=MTHEN20
23 NEXT
24 N(S)=M
25 IFS=24THEN27
26 GOTO19
27 S=0
28 FORI=0TO4
29 FORT=1TO5
30 S=S+1 IFS=25THENS=0 GOTO33
31 POKE7680+22*(6+I)+8+T N(S)
32 NEXTT I
33 TI$="000000
34 GOTO64
35 PRINT"■■■■■■■■■■■■INPUT NUMBER TO BE MOVED" INPUTNO$
36 NO=VAL(NO$)
37 PRINT"□              "
38 TM=VAL(LEFT$(TI$,2))*3600+VAL(MID$(TI$,3,2))*60+VAL(RIGHT$(TI$,2))
39 IFNO<1ORNO>24ORNO<>INT(NO)THEN48
40 FORI=0TO4
41 FORJ=0TO4
42 P=(7821+22*I+J)
43 IFPEEK(P)=NOANDPEEK(P+22)=32THENPOKEP+22,NO POKEP,32 GOTO49
44 IFPEEK(P)=NOANDPEEK(P+1)=32THENPOKEP+1,NO POKEP,32 GOTO49
45 IFPEEK(P)=NOANDPEEK(P-22)=32THENPOKEP-22,NO POKEP,32 GOTO49
46 IFPEEK(P)=NOANDPEEK(P-1)=32THENPOKEP-1,NO POKEP,32 GOTO49
47 NEXTJ,I
48 PRINT"■■■ILLEGAL NUMBER!" FORI=1TO1000 NEXT PRINT"□               " GOTO35
49 S=0
50 FORI=0TO4
51 FORJ=0TO4
52 P=(7821+(22*I)+J)
53 S=S+1 IFS=25THEN56
54 IFPEEK(P)<>STHEN64
55 NEXTJ,I
56 PRINT"■YOU DID IT !!" FORI=1TO2000 NEXT
57 IFTM<LTTHENLT=TM
58 GOSUB95
59 PRINT"□■■■■ANOTHER GO (Y/N)?"
60 POKE36869,240
61 GETA$ IFA$<>"Y"ANDA$<>"N"THEN61
62 IFA$="Y"THEN2
63 IFA$="N"THENPRINT"□■" END
64 FORI=0TO4 FORJ=0TO4 POKE38541+(22*I)+J,INT(PEEK(7821+(22*I)+J)/5.1)+2 NEXTJ,I GOTO35
65 POKE51,255 POKE52,27 POKE55,255 POKE56,27 FORI=0TO511 POKE7168+1,PEEK(32768+I)
66 RESTORE
67 FORI=7168TO7383 READB POKEI,B NEXT POKE36869,255 GOTO3
68 DATA129,66,60,36,36,60,66,129
69 DATA0,8,8,8,8,8,8,0
70 DATA0,126,2,2,126,64,64,126
71 DATA0,62,2,2,30,2,2,62
72 DATA0,16,20,20,31,4,4,4
73 DATA0,126,64,64,126,2,2,126
74 DATA0,16,16,16,30,18,18,30
75 DATA0,62,2,2,2,2,2,2
76 DATA0,126,66,66,126,66,66,126
77 DATA0,126,66,66,126,2,2,126
78 DATA0,94,82,82,82,82,82,94
79 DATA0,36,36,36,36,36,36,36
80 DATA0,94,66,66,94,80,80,94
81 DATA0,94,66,66,78,66,66,94
82 DATA0,80,84,84,95,68,68,68
83 DATA0,94,80,80,94,66,66,94
84 DATA0,80,80,80,94,82,82,94
85 DATA0,78,66,66,66,66,66,66
86 DATA0,94,82,82,94,82,82,94
87 DATA0,94,82,82,94,66,66,94
88 DATA0,239,41,41,233,137,137,239
89 DATA0,228,36,36,228,132,132,228
90 DATA0,238,34,34,238,136,136,238
91 DATA0,238,34,34,238,130,130,238
92 DATA0,232,40,42,239,130,130,226
93 DATA233,175,233,201,169,1,255,0
94 DATA0,60,66,90,82,90,66,60
95 PRINT"□■■■■■NUMBER PUZZLER"
96 PRINT"■■■BY R.D.MORTON
97 PRINT"■■■TIME ="TM
98 PRINT"■■■LOWEST TIME ="LT
99 PRINT"■■YOU MUST GET ALL THE  NUMBERS IN THE CORRECTORDER LIKE THIS"
100 PRINT"■■■■■■■■■@@@@@@"
101 PRINT"■■■■■■■■■@ABCDE@"
102 PRINT"■■■■■■■■■@FGHIJ@"
103 PRINT"■■■■■■■■■@KLMNO@"
104 PRINT"■■■■■■■■■@PQRST@"
105 PRINT"■■■■■■■■■@UVWX @"
106 PRINT"■■■■■■■■■@@@@@@"
107 PRINT"■TYPE IN THE NUMBER TO BE MOVED INTO THE      SPACE"
108 PRINT"■■HIT ANY KEY",
109 GETG$ IFG$=""THEN109
110 RETURN
```

Number Puzzler
by R Morton

Mortgage

on Spectrum

This program calculates the monthly repayments on a mortgage for a range of rates in steps of ½ percent and for up to 3 repayment periods in steps of one year.

If you are uncertain of these terms use the example below as a guide:

Mortgage £50 000
Number of rates 10
Starting rate 12
Number of periods 3
Starting period 20

Program notes

5	Set screen colour
10-110	Input and error checking
115-350	Draw table calculate print results
360-380	Write title

```
   5 BORDER 0  PAPER 0  INK 3
  10 CLS   INPUT "ENTER AMOUNT O
F MORTGAGE OR LOAN",A
  20 INPUT "NUMBER OF DIFFERENT
RATES (1-10)? ",NR
  30 IF NR<>INT NR THEN CLS   PR
INT "NO FRACTION PLEASE,TRY AGAI
N"  GO TO 20
  40 IF NR<1 OR NR>10 THEN CLS
 PRINT "IT MUST BE BETWEEN 1 AND
 10,TRY AGAIN"  GO TO 20
  50 INPUT "ENTER STARTING RATE
",SR
  60 IF SR<=0 THEN CLS   PRINT "
STARTING RATE MUST NOT BE LESS
THAN ZERO,TRY AGAIN"  GO TO 50
  70 INPUT "NUMBER OF DIFFERENT
PERIODS (1-3)? ",NP
  80 IF NP<>INT NP THEN CLS   PR
INT "NO FRACTION PLEASE,TRY AGAI
N"  GO TO 70
  90 IF NP<1 OR NP>3 THEN CLS
PRINT "IT MUST BE BETWEEN 1 AND
3,TRY AGAIN"  GO TO 70
 100 INPUT "ENTER STARTING PERIO
D ",SP
 110 IF SP<1 THEN CLS   PRINT "I
T MUST BE AT LEAST 1,TRY AGAIN"
 GO TO 100
 115 LET LP=SP+NP-1
 120 CLS   PRINT AT 0,7+(NP+2),"
YEARS"
 130 FOR N=7 TO NP*7+8  PRINT AT
1,N,"■",  NEXT N
 140 PRINT   PRINT " RATES ▌ ",
 150 FOR N=SP TO LP  PRINT N,"
 ",  NEXT N
 160 PRINT AT 2,NP*7+8,"▌"
 170 FOR N=0 TO NP*7+8  PRINT "■
",  NEXT N  PRINT
 180 FOR L=1 TO NR
 190 LET RATE=SR+0.5*(L-1)
 200 PRINT "▌",RATE,  IF RATE=IN
T RATE THEN PRINT ".0% ▌",  GO T
O 210
 205 PRINT "% ▌",
 210 LET M=1+RATE/1200
 220 LET MM=1
 230 FOR N=1 TO 12
 240 LET MM=MM*M  NEXT N
 250 LET C=1
 260 FOR P=1 TO SP
 270 LET C=C*MM  NEXT P
 280 FOR P=SP TO LP
 290 LET R=A*RATE/1200*C/(C-1)
 292 LET R$=STR$ R  FOR I=1 TO L
EN R$  IF R$(I)="." THEN LET IND
EX=I
 293 NEXT I
 294 IF LEN R$>6 THEN GO TO 298
 296 PRINT R$,"0"," ",  GO TO 31
0
 298 IF VAL R$(INDEX+3)>=5 THEN
LET K=VAL R$(INDEX+2)+1  LET R$(
INDEX+2)=STR$ K
 300 PRINT R$(1 TO INDEX+2)," ",
 310 LET C=C*MM
 320 NEXT P
 330 PRINT AT 3+L,NP*7+8,"▌"
 340 NEXT L
 350 FOR N=0 TO NP*7+8  PRINT AT
3+L,N,"■",  NEXT N
 360 PRINT   PRINT   PRINT "THE
MONTHLY LOAN OR MORTGAGE     REPA
YMENTS ",
 370 PRINT "ON £",A," FOR PERIOD
S FROM ",SP," TO ",LP,
 380 PRINT " YEARS AND RATES FRO
M  ",SR,"% TO ",RATE,"%"
 390 PRINT AT 21,0,"press any ke
y to continue"
 398 IF INKEY$="" THEN GO TO 398
 400 GO TO 10
```

Mortgage
by C F Choo

Circle

on Dragon 32

This short routine draws a circle. You can choose the radius and join concentric circles with lines.

You can use these two simple instructions to create quite elaborate and pleasing patterns.

```
10 REM DRAW A CIRCLE BY S.J. AND S.S.
20 CLS   PRINT "ENTEP THE CIRCLE RADIUS (MAX=95)"
30 INPUT R
40 IF R>95 TNEN 20 ELSE 50
50 PRINT : PRINT "DO YOU WANT LINES JOINING        CIRCLES"   INPUT P$
60 PRINT : PRINT "IF YOU WANT RADIUS CHANGED   TNEN PRESS Q"
70 PRINT : PRINT "TO CLEAR SCREEN PFESS C"
90 PRINT : PRINT "### PRESS ANY KEY TO START ###"
90 F$ = INKEY$   IF F$ = "" THEN 90
100 PMODE 4   SCREEN 1,1   PCLS
110 A = JOYSTK (0) * 4.5   B = JOYSTK (1) * 3
120 IF P$ = "N" TNEN 140
130 LINE - (A,B) , PSET
140 CIRCLE (A,B),R,5
150 R$ = INKEY$   IF R$ = "C" THEN PCLS
160 IF R$ = "Q" THEN 20 ELSE 110
```

Circle
by Sunil Singh

Tron Light Cycles

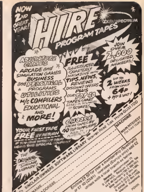
on BBC

Light Cycles is for the model B. It is a two player game based on a well-known film. One bike starts from the top of the screen the other from the bottom.

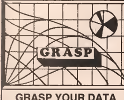
When accelerating it is possible to go through the other player's light wall. If you do this you should kill yourself by turning back on yourself. The first time you run the program you will see instructions. If you wish to see them after this you should type A% = 0 *Run Return*

```
10REM   TRON LIGHTCYCLES.
15REM      BY
16REM   KEVIN BOYD
20ENVELOPE1,8,1,-1,1,1,1,1,121,-10,-5,-2,120,120
30IFA%=0 MODE7:PROCIntro:A%=1
40MODE2
50VDU23;8202;0;0;0
60PROCSet_up
70REPEAT
80PROCTRON_move
90PROCcycles
100UNTILCRASH=1 OR CRASH =2
110IF CRASH=2 THEN TRONX=CYCLEX : TRONY = CYCLEY
120PROCSmash
130PROCAGAIN
140MODE7
150END
160
170DEFPROCIntro
180CLS
190PRINT
200PRINT"T R O N   L I G H T   C Y C L E S"
210PRINT  "TRON IT IS YOUR JOB TO RACE YOUR LIGHT  CYCLE AGAINST THE M.C.P. ON
THE GAMES    GRID"
220PRINT  'CONTROLS ARE : UP-@"
230PRINT "      LEFT-:        RIGHT-]"
240PRINT "              DOWN-/'
250PRINT " SPACE BAR - EXCELERATE'
260PRINT  'GOOD LUCK GAMES WARRIOR'"
270PRINT  "    PRESS ANY KEY TO CONTINUE"
280A$=GET$
290CLS:PRINT  "M.C.P. IT IS YOUR JOB TO RACE YOUR LIGHTCYCLE AGAINST TRON ON T
HE GAMES GRID."
300PRINT  "CONTROLS ARE : UP-W"
310PRINT "      LEFT-A        RIGHT-D"
320PRINT "              DOWN-Z"
330PRINT "   TAB - EXCELERATE"
340PRINT  'GOOD LUCK GAMES WARRIOR'"
350PRINT  '    PRESS ANY KEY TO START"
360A$=GET$
370ENDPROC
380
390DEFPROCSet_up
400CLS
410VDU19,0,4,0,0,0
420GCOL0,7
430SOUND0,1,10,20
440FORI=500TO0STEP-30
450MOVEI,I
460DRAWI,1023-I
470DRAW1279-I,1023-I
480DRAW1279-I,I
490DRAWI,I
500NEXT
510CLS
520GCOL0,1
530FORI=0TO1279STEP100
540MOVE0,I:DRAW1279,I:MOVEI,0:DRAWI,1023
550NEXT
```

Continued on page 55



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GRASP

Continued from page 53

```
560GCOLO,3
570MOVEO,0:DRAWO,1023:DRAW1279,1023:DRAW1279,0:DRAWO,0
580GCOLO,7
590 TRONX=600:TRONY=10:TR_SPEED=5:MO=3:CRASH=0
600CYCLEX=600:CYCLEY=1020:CY_SPEED=5:CM=1
610ENDPROC
620
630DEFPROCTRON_move
640MOVETRONX,TRONY
650IFINKEY(-98)=-1 MO=1
660IFINKEY(-89)=-1 MO=2
670IFINKEY(-72)=-1 MO=3
680IFINKEY(-105)=-1MO=4
690IFINKEY(-99)=-1 TR_SPEED=TR_SPEED+5 ELSE TR_SPEED=TR_SPEED-2
700IF TR_SPEED<5THENTR_SPEED=5
710IFMO=1THEN TRONX=TRONX-TR_SPEED:HITX=TRONX-8:HITY=TRONY
720IFMO=2THEN TRONX=TRONX+TR_SPEED:HITX=TRONX+7
730IFMO=3THEN TRONY=TRONY+TR_SPEED:HITX=TRONX:HITY=TRONY+5
740IFMO=4THEN TRONY=TRONY-TR_SPEED:HITX=TRONX:HITY=TRONY-5
750DRAWTRONX,TRONY
760 IFPOINT(HITX,NITY)=7ORPOINT(HITX,HITY)=-1THEN CRASH=1
770ENDPROC
780
790DEFPROCcycles
800MOVECYCLEX,CYCLEY
810IFINKEY(-66)=-1 CM=3
820IFINKEY(-51)=-1 CM=4
830IFINKEY(-97)=-1 CY_SPEED=CY_SPEED+5 ELSE CY_SPEED=CY_SPEED-2
840IFCY_SPEED<5THENCY_SPEED=5
850IFINKEY(-34)=-1 CM=2
860IFINKEY(-98)=-1 CM=1
870IFCM=1THENCYCLEY=CYCLEY-CY_SPEED:HX=CYCLEX:HY=CYCLEY-7
880IFCM=2THENCYCLEY=CYCLEY+CY_SPEED:HX=CYCLEX:HY=CYCLEY+7
890IFCM=3THENCYCLEX=CYCLEX-CY_SPEED:HX=CYCLEX-8:HY=CYCLEY
900IFCM=4THENCYCLEX=CYCLEX+CY_SPEED:HX=CYCLEX+8:HY=CYCLEY
910DRAWCYCLEX,CYCLEY
920IFPOINT(HX,HY)=7ORPOINT(HX,HY)=-1THEN CRASH=2
930ENDPROC
940
950DEFPROCSmash
960SOUNDO,1,20,40
970FORI=1TO100
980PLOT69,(RND(30)+TRONX)-10,(RND(30)+TRONY)-10
990GCOLO,RND(7)
1000NEXT
1010VDU19,7,15,0,0,0
1020FORD=1TO5000:NEXTD
1030VDU19,7,7,0,0,0
1040ENDPROC
1050
1060DEFPROCAGAIN
1070CLS
1080IF CRASH=2 PRINT "TRON BEAT THE M.C.P." ELSE PRINT "M.C.P. BEAT TRON."
1090PRINT 'ANOTHER GO (Y/N)?"
1100*FX15,1
1110A$=GET$
1120IFA$="Y"THENRUN
1130IFA$="N"THENENDPROC
1140PRINTCHR$7:GOTO1110
```

Tron Light Cycles
by Kevin Boyd

Spirals

on ZX81

In this game you have to reach the centre of the spiral as quickly as you can. If you hit the sides you are sent back to the beginning of the spiral.

When the game is run you use the cursor keys to move. If you press S then the game is saved on cassette. At the end of the game you are asked if you want to play again. You are told how long it took you to reach the end.

Variables
T = Time taken
A$ = The spiral
Z$ = Instructions

```
   1 REM "WRITTEN BY D.WYATT(18/5/81) 3K"
   9 LET T=0
  10 DIM A$(21,32)
  20 DIM Z$(246)
  30 LET Z$="          SPIRALS

            IN THIS GAME OF SPIRALS YOU HAVE TO GET TO THE CENTRE OF THE       SPIRAL IN THE LEAST AMOUNT OF    TIME

            PRESS ANY KEY TO START"
  40 FOR Z=1 TO 246
  50 PRINT Z$(Z),
  60 NEXT Z
  70 IF INKEY$="" THEN GOTO 70
  80 CLS
  90 LET A$(1)="████████████████"
 100 LET A$(2)="█"
 110 LET A$(3)="█ ██████████████"
 120 LET A$(4)="█ █             █"
 130 LET A$(5)="█ █ ██████████  █"
 140 LET A$(6)="█ █ █         █ █"
 150 LET A$(7)="█ █ █ ██████  █ █"
 160 LET A$(8)="█ █ █ █     █ █ █"
 170 LET A$(9)="█ █ █       █ █ █"
 180 LET A$(10)="█ █ ██████████ █"
 190 LET A$(11)="█ █            █"
 200 LET A$(12)="█ █████████████"
 210 LET A$(13)="█"
 220 LET A$(14)="███████████████"
 226 PRINT AT 0,0
 230 FOR A=1 TO 14
 240 PRINT A$(A)
 250 NEXT A
 255 LET A=0
 257 LET B=10
 260 PRINT AT A,B;"*"
 265 PRINT AT A,B;" "
 266 IF A=9 AND B=7 THEN GOTO 350
 270 IF INKEY$="8" THEN LET B=B+1
 280 IF INKEY$="5" THEN LET B=B-1
 290 IF INKEY$="7" THEN LET A=A-1
 300 IF INKEY$="6" THEN LET A=A+1
 305 IF INKEY$="S" THEN GOTO 9000
 310 IF A$(A,B+1)="█" THEN GOTO 255
 330 LET T=T+1
 340 GOTO 260
 350 PRINT AT 16,0,"YOU MADE IT IN ",T
 360 IF T<110 THEN LET B$="A PROFESIONAL"
 370 IF T>110 AND T<210 THEN LET B$="NEARLY A PROFFESIONAL"
 380 IF T>210 THEN LET B$=" A SLOW PERSON"
 390 PRINT AT 20,0,"YOU ARE ",B$
 400 PRINT AT 21,0,"ANOTHER GAME?(N/L=YES)"
 410 IF INKEY$="" THEN GOTO 410
 415 CLS
 420 IF INKEY$<>"N" THEN RUN
 430 GOTO 430
9000 SAVE "SPIRALS"
9010 IF T=0 THEN RUN
9999 GOTO 310
```

Spirals
by D Wyatt

Microradio

GW6JJN

Beacons and repeaters

Last week I mentioned repeaters and beacons. A beacon is a radio station which emits a constant tone and a call sign identification. Their purpose is to give the radio enthusiast an indication of conditions for transmitting and receiving.

If a beacon can be heard in a particular area, then it is likely that a contact can be made in that direction. Wherever in the world or the country concerned, if you listen for the beacons, then you will be able to hear other radio transmissions. If the beacons cannot be heard, then don't bother.

Similarly, there are things called repeaters. These are radio stations that are available to the radio enthusiast that are unmanned receivers and transmitters. You can use these repeaters to extend the area covered by the station concerned. For example, if I wish to contact a station that is out of range, then I transmit to the repeater which receives my message and then relays that signal from its own transmitter.

The logic control of beacons and repeaters are almost completely in the hands of a microprocessor, or a microcomputer. This means that they do not have to be manned and can be left to their own devices.

So, how do you locate a beacon or repeater? Lists of their locations can be obtained from the Radio Society of Great Britain. These lists give the locations of the beacons and repeaters in a code called the QRA code.

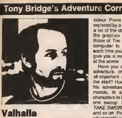
The QRA code is a system of squares which cover Europe in a logical form. Each square is given two letters and then the square is divided into smaller squares with numeric codes. These are then divided again, until a QRA locator can be given in the form *XL20b*, for example, which will determine a location to within a mile or so anywhere in Europe.

A microcomputer is the ideal way of working out not only what the QRA code is or where it is in terms of latitude and longitude, but also telling you the distance from your home and the compass direction. This is a very good programming exercise, in fact it took a few pints of midnight oil when I made one.

Next week, I shall be reviewing some commercially made programs for the radio enthusiast. ●

Ray Berry GW6JJN

This series of articles is designed for radio and microcomputer enthusiasts alike. If you have any queries that you want answered, hints and tips to share or topics that you would like to see covered write to Ray Berry, Microradio, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2R 3LD.



Valhalla

Two or three years ago before the explosion of the home micro, Molimerx marketed, for the TRS-80 and Video Genie a series of adventures called *Mysterious Adventures* They had intriguing titles like *Arrow of Death The Time Machine* and *Feasibility Experiment* I had always wondered what they were like to play but have only now had the chance to see them And very impressed I am too!

As well as those machines I've just mentioned the series is now being written for the 48K Spectrum, the Commodore 64 the BBC B Oric Dragon — in fact by the end of the year just about all the present home micros should have a version

Channel 8 now handles the programs for the Atari Dragon and Commodore, while Digital Fantasia takes care of marketing the BBC and Spectrum versions

So what are they like?

Brian Howarth, the genius who wrote most of the adventures, has a unique touch when it comes to scenarios You'll find that playing these *Mysterious Adventures* will take you from a deserted circus, by the side of a lonely country road, to a gigantic space freighter hiding from a mutated Zoo-specimen, to the realms of ancient mythology, or a strange house on the moors

The Atari adventures are pure text in the traditional mould — that is, they accept two-word commands such as "Go North" and "Take Ring" The programs are written for the 16K memory so, no graphics However, the responses are extremely quick (I imagine the computer scans your words as you are typing)

The versions for the Spectrum include graphics, and very good they are too They are drawn rather quickly, with a diamond shape expanding rapidly to fill areas with colour Press *Enter* and the picture will be replaced by a description of the scene and a list of the objects at the scene Although the graphics are as pretty to look at as those of *The Hobbit*, you may instruct the computer to refrain from drawing them each time you arrive at a location, and just give you a resumé of the objects currently at the scene

Have you ever got near the end of an adventure, only to find that you left the all-important ring 52 moves back toward the start? Howarth thought of that, and in his adventures you may type in commands, in short-hand and up to 255 characters in length to get straight back in one swoop So, you may type "*NNSE TAKE SWORD WWW KILL WOLF N* and so on Press *Enter* and the computer will instantly obey all your commands with responses along the way

I recommend these very highly though be warned they can be excruciatingly difficult and infuriating! The range at the moment is *The Golden Baton The Time Machine Arrow of Death (Parts 1 and 2) Escape from Pulsar 7 Circus, Feasibility Experiment The Wizard Akyrz, Perseus and Andromeda* and *Ten Little Indians* ·

These titles will be joined by *Waxworks* and the Christmas adventure *Midwinter* In the New Year a post-Holocaust adventure *After the Fire*, will be released

The fellows in the office at *Popular Computing Weekly* are a keen bunch of adventurers like the rest of us This of course makes them an extremely likeable and very sane lot! There is a catch, though — I have a lot of trouble getting to see the latest programs And when it is a program which has been long-awaited and heralded as loud as *Valhalla*, then I am in a long queue!

Valhalla, from Legend/Moviesoft, is at last with us, and by the time you read this, the first orders should have been filled At the time of writing, I have only seen a pre-production copy and, for the reasons I've already mentioned, not for very long However I can tell you that it is good — very good

The object of the adventure for you, the player is to complete six quests If you are successful, you take your rightful place in Valhalla, home of the Gods The atmosphere of the whole piece is heavy with Teutonic/norse mythology with characters like Thor, Odin and so on

I haven't got very far into the actual adventure, but the graphics certainly make a good impression A *Hobbit*-like split-screen technique is used although the pictures are a mite simpler than Melbourne House's — a unique, Letraset style shading is employed to give a more appealing look to the graphics than is usual

Once the picture of the location is drawn, on walk the characters Yes, there is animation in *Valhalla*! These characters, and there may be several on-stage at once are endowed with individual movement, so that you may sit back and watch them entering leaving and occasionally fighting There are Gods like the aforementioned Thor and Odin as well as assorted dragons, rooks and other animals You'll also see objects like keys food and jugs of wine lying about for you to take and use — if you get to them first, that is

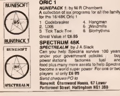
Some of the other characters are good, some bad — you can refer to the large manual and find each one's attributes and from this information make judgements on the likelihood of skulbuggery If you decide to fight a character, make sure that your choice is a good one — the success of the adventure depends on you keeping on good terms with your friends!

The lower half of the screen display is reserved for your instructions, and the computer's responses If you type *Who*, the computer will name all the characters currently on screen Commands may be multi-statement, as in *Get the Sword, take the food*, eat the *food*, and *go north* You are able to fight any character, and the sequence takes place on-screen You may even fight yourself, though this is usually fatal!

So, all those adventurers who have been waiting for a successor to *The Hobbit* this program is worth a long look — it has stunning graphics an intelligent command input, and independent action from the other characters in the scenario It is too early for me to say whether the adventure plays as well as others but I shall bring you a more detailed look when it has had a good thrashing at the office ■

The December Microfair is only a few weeks away — I hope to see you all there I shall have a bag full of new adventures including *Valhalla* as well as *Golden Apple* Hewson's *Quest* and many others I'll also have a few crib sheets on the old favourites So if you have any problems with adventures or just want information and advice why not pop along say hello and have a chat?

This series of articles is designed for novice and experienced Adventurers alike Each week Tony Bridge will be looking at different Adventures and advising you on some of the problems and pitfalls you can expect to encounter So if you have an Adventure you want reviewed, or if you are stuck in an Adventure and cannot progress any further, write to Tony Bridge, Adventure Corner *Popular Computing Weekly* 12-13 Little Newport Street London WC2R 3LD


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WHAT IS ALU?

Colin Kirk of Oak Copse Lane Crawley writes

Q Please can you tell me what the computer jargon *Alu* stands for? And can you tell me if it is important to buy a computer that has it?

A You could not buy a computer that does not have it! The *Alu* or Arithmetic Logic Unit, is part of the Central Processing Unit whether a 6502 such as in the BBC or the Z80 sound in the Spectrum

It is the part of the computer that performs calculator functions Numbers are passed to the *Alu* by the *cpu* and registers are then incremented or decremented to produce the result required

SUITABLE MODEM

P Crawley of Humberway, Donnington, Telford, Salop, writes

Q I am planning to buy a Sinclair Interface 1, and a Microdrive, when I get the order form. I would also like to buy a modem, since the interface has an RS232 capability I wonder if you could recommend a suitable device.

Obviously I need one that will accept the various baud rates that the Interface uses, so that I can communicate with systems operating at different rates Is there a standard rate like 300 baud as used by the special Maplin Interface If so, would you recommend it? Failing this, do you think that Sinclair will bring out their own modem?

A Although the Interface carries the all important RS232c port and thus is, (in hardware terms) capable of being connected to a modem, anyone trying to do this will find problems The RS232c is not hardware controlled but software controlled, and you would have to write the necessary terminal software in machine code This would be made harder because the Input Handshaking line also turns off the output line, thus making it very difficult to use with a modem

This means buying the Maplin Interface is probably a good idea As for a specific modem, I haven't much information on those that are available, but all should enable you to communicate with *Ascii* standard computers — this does not though include Prestel Regarding Sinclair's plans, I would not expect them to bring out a modem in the immediate future

THE POWER

E Hasson of Cecil Road Acton, London W3 writes

Q Could you please help me? I have a 48K Spectrum, and recently came across this line in a program, 2∧ power could you please tell me what this is? The only things I can find are < and >

A The confusion arises because some printers print this symbol ↑ (on the U key) as Just use the former one whenever the latter appears in a program They both mean the same thing 'to the power of'

SIMPLE METHOD

Mr T Derwent of Garth Road Kingston upon Thames Surrey, writes

Q I have bought a Spectrum and have become reasonably competent at programming in Basic I want to learn machine code and have bought Rodney Zaks' book on the subject but find I can't understand it at all Is there any simple way of learning machine code?

A You haven't chosen a very easy book to learn on The sheer size is imposing enough, and as it does assume some prior knowledge of the subject it isn't surprising you have found it heavy going

There are a number of much simpler books around I will mention a couple but there are many others *Machine Code and Better Basic* by Ian Stewart and Robin James (Shiva), *Spectrum Machine Code Made Easy Vol 1* (Interface)

BBC OR ELECTRON

Darren Boden of Alyward Gardens Chesham Bucks writes

Q I have a Vic20 and I now wish to purchase a BBC B However seeing the new Electron makes me wonder. Could you tell me the difference between the two computers? Can the BBC B be worth an extra £200?

A As I have said before only you can make the choice The Electron is a good computer to start on and is much superior to the Vic you are used to However, it is limited in terms of expansion The most obvious omission is somewhere to add a printer Getting printouts might be important to you — in this case you will find the Electron a disappointment

When compared with the BBC obviously the Electron is inferior for one thing it is noticeably slower, but after all it is a hardly insignificant £200 cheaper Against similarly priced computers it looks a reasonably good buy

CYBORG SYSTEM

Vanwaeyenberghe Andre of Yskelderstraat, Ghent, Belgium writes

Q I have a problem. Although the Microdrive is available soon I would rather have a real floppy disc Is there a device that can link my 48K Spectrum to a floppy disc? I have heard of something called the Cyborg, but I cannot find any information on it. Can you help?

A I would like to be able to give you further details on the Cyborg system because a large number of people have expressed interest in it Unfortunately I have never seen the drive, or even an advertisement for them Indeed I don't know that there is a unit in the country Other than that I can only direct you to the information we published in *PCW* 5-11 May

In fact you may find it simpler to contact the company directly Their address is 22 Boulevard Saint Michel 75006 Paris France their telephone number is 1-329-6237

A number of people have contacted me with questions concerning how to connect their Spectrums to standard monitors The main reason for doing this being to turn the Spectrum into an effective word processor

As it stands you will not be able to connect your Spectrum to a conventional monitor even though the *Pcb* can produce the required composite video signal

The solution, though is simple Inside the Spectrum is a video bus leading to the TV socket at the back This, in conjunction with the 0 volt line, will produce a composite video output The only problem is a small gap in the video line, what's it for? Well Sinclair will tell you that they didn't think anyone would want to use their Spectrum with a monitor!

Near the edge connector on the *Pcb* you will see the word Vid and two small spots A tiny blob of solder to join these two together and voilà — the requisite output Interestingly the issue 3 Spectrums do not have this gap and all the Spectrums that went to schools were modified for use with monitors One last point though, if you do this soldering you will invalidate your Sinclair guarantee

Is there anything about your computer you don't understand, and which everyone else seems to take for granted? Whatever your problem *Peek* it to Ian Beardsmore and every week he will *Poke* back as many answers as he can. The address is *Peek & Poke*, *PCW*, 12-13 Little Newport Street, London WC2R 3LD.



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VIC20 plus £300 software and cartridges and games (ZX80 for swap for Pet computer Tel Chorley 66874 anytime

VIC20, hardly used unwanted gift £9 Tel 021 3826135 anytime

VIC20 plus cassette unit, 3K expansion Vickit 2 Reference Guide joystick plus £160 software £140 ono Tel 01-668 1131

21K VIC20 CASSETTE UNIT, joystick, manuals books magazines lots of games and original box, £200 Tel 0502 202638 after 4 30 pm

VIC20 plus cassette unit super expander programmers reference guide paddles tons of magazines and games Excellent condition Bargain at £170 ono Tel Folkestone 0302 77135

COMMODORE 64 plus cassette recorder and joystick technical reference guide books and software cassettes Very good condition £260 ono Tel (08845) 65857

VIC20 plus cassette unit, three cartridges plus six cassettes and book of games still under guarantee cost over £300 accept £185 or closest offer Tel 041-881 0228 (evenings)

VIC20 with cassette deck 16 Ram super expand cartridge many magazines and books many games including two cartridge games and Commodore joystick only £160 Tel Harlow 0279 37629 after 6 pm

VIC20 DISC DRIVE with few utility discs, still under guarantee £130 Tel 01 574 4122 between 6 pm and 8 pm

VIC20 new C2N cassette player 16K Ram Programmers aid cartridge six game cartridges over £200 cassettes Introduction to Basic 1 and 2 £30 of books Offers please Tel 061-491 2117 (daytime) 0254 580351 after 7 pm

VIC20 plus two manuals and three cassette games magazines still under guarantee £100 Tel Reigate 43808 after 7 pm

COMMODORE 64 + software + joystick hardly used £175 Please ring Bill after 6 30 01-838 3350

COMMODORE 64 + cassette deck and joystick + software as new still boxed cost £300 sell for £210 ono Tel 01-863 0184

VIC20 1 cartridge 2 cassettes joystick £100 Tel 01-658 1722

VIC20 The Count swap for Pirate Cove or Voodoo Castle

URGENT! Must swap Vic20 Micro for BBC Model B or sell for £180 sale Christmas present, preferably swap learning BBC Basic Tel Wakefield (0924) 253265 any time for details

VIC20 + C2N tape + 8K + 3K super expander + revision aid + programmers reference guide + software magazines still under guarantee worth over £260 £200 ono Tel No1 636 2272 after 4 30 pm.

VIC20 + C2N cassette deck plus joystick super expander and software magazines and books. worth £230 accept £120 ono Tel Epsom 29810

VIC20, 32K, 40/80 column card Vickit 1 super expander 3 adventure and 2 games cartridges + cassette software worth over £450 sell for £300 Name and address?

VIC20 GAMES, to swap Catcha Snatcha, Asteroids plus loads of games for most other games Games and code are new Also will swap joystick for game. Name and address??

VIC20 C2N cassette unit, 16K Ram joystick £100 software £160 — bargain Tel 0296 76421 anytime

COMMODORE C2N CASSETTE UNIT, as new £20 Tel New Mills (Derbyshire) 42486

COMMODORE 64, one month old unused cassette deck, games + magazines, £225 Tel 874 5580 after 4 30 pm.

VIC20 C2N 16K, 8K 3KSE machine code Rom 7 shot Arfon joystick, paddles £100 of software 18 carts worth £1 400 yours for £370 ono Tel Dudley (0384) 57360 6 pm.

Dragons for sale

DRAGON software for sale Carsport, Shuttle Champions Ghosts etc £4 each or £40 for the lot Tel 061-334 0365

DRAGON 32 under guarantee in good condition £100 of software 2 joysticks light pens cassette and recorder books and magazines sell for £160 Tel 01-294 7079 evenings

DRAGON 32 boxed with leads joystick cartridge software + magazines worth over £230 sell for £160 Tel Coventry 414181

DRAGON 32 boxed £160 software lots of magazines tape recorder all leads £220 ono Tel 061-445 1341

DRAGON 32 with manuals boxed still under guarantee spare cassette recorder leads £135 ono 01-574 1420 before 6 pm and after 10 am

DRAGON 32 + joystick cables, + many games. £140 ono Tel Upminster 27116

DRAGON 32 + three joysticks + over £500 of software all for £195 + DCB sound extension module £27 or the lot for £215 061 980 7369

DRAGON 32 with PSO + Jestle books cassette + Monitor Special Joystick + £30 of software £150 Ring Dick after 6 pm on 021 395 5868

DRAGON 32, one month old three games Greedy Gobler Hungry Horace Penetrator £45 ono Tel 0634 408 306

DRAGON 32, still boxed one month old all manuals and leads remote control cassette recorder two joysticks + tapes, £170 Tel Keith 0254 391 020

DRAGON 32, boxed joystick, cassette cable books mags + software including Chess and Dragon Trek, £130 Tel 0373 694602.

DRAGON 32, guarantee expired good condition £50 software all leads, £130 ono Tel 061 761 7617



ORIGINAL DRAGON SOFTWARE for sale 28 games tapes plus three cartridges worth over £270 will sell together for £90 Ring 01-854 3350

DRAGON 32 boxed as new + joysticks four games including Donkey King £155 Tel Mr Casella, 267 0055

DRAGON 32, good as new manuals two sets of leads home-made software back numbers *Popular Computing Weekly* £145 also a few TDK blank tape Tel 01-574 0051 anytime

DRAGON 32, two joysticks cassette recorder dust cover over £135 software latest games £200 ono Tel Erith 49408 evenings only

DRAGON 32, new leads + manuals + books £130 Tel 0736 2311

DRAGON 32, joystick lots of software including Donkey King Space Shuttle, etc cassette player + leads + cassette holder £165 Tel Blackpool 662 336

DRAGON 32 GAMES Bunkum Monsters Nine Evector Right Flight, Dragon Mountain Dragon Special Selection 2 Golf Telephone for details 0236 21918 (new Glasgow)

DRAGON 32 seven months old still guaranteed in box, joysticks £90 software £25 books all for £160 Tel (Tottenham) 01-808 4124 evenings

DRAGON 32, as new boxed + joystick cassettes, Donkey King books, *Dragon User* magazines all for £160 Tel 01-777 8089

DRAGON 32, joysticks, over £220-worth of software including chess cartridge, books and magazines, cost £480 will ash for £240 ono Tel Liverpool 486 8690

DRAGON 32 REQUIRED £100+ for a sound machine despatch/collection arranged immediate decision Details to A Ellis, 22 Turnavean Road St Austell Cornwall PL25 5NX.

DRAGON SOFTWARE, Hi Res cartridge £20 Meteroid cartridge £13 Donkey King Vultures Planet Invaders £5 each Dust cover £1 Joystick £8 no swaps Tel 01-942 5096 after 6 pm

DRAGON COMPUTER. Over £100-worth of software Dragon joystick four books Cost £357 new Tel Dorking (0306) 0884428 (evenings)

DRAGON 32, new boxed with joystick, few games including The King £130 Tel 01-267 0055

DRAGON SOFTWARE. Microdeal Composer £10 Madness and the Minotaur £4 Grid Runner £8 All three for £17 Tel 0432 273439 (Hereford)

DRAGON 32 for sale Still boxed all wires included 2 joysticks £50 worth of software 1 book All basic 2 months last sell for around £175

Ataris for sale

ATARI 400 Basic recorder game cartridge 3 cassettes joystick 5 books + 15 magazines 5 months old worth £260 sell for £120 or swap + £170 for BBC Model B with 1 2 os Tel Leeds (0532) 744994

ATARI 800 16K with 410 recorder manuals basic sticks £150 software bird offers over £225 Buyer to collect Tel 01-741 4030 ext 0752 day

SWAP for screen editor assembler (OCP) for machine/code test tool (OCP) also games to swap or sell Tel Calm 515 4886 anytime

FREE £2 500 of disc-based software if you take my complete 48K system + archiver disc drive off me for £450 no share Tel Reading 722293 after 7 pm

ATARI VCS + joysticks paddles and 7 cartridges, Combat Asteroids Defender Missile Command Night Driver Pac Man Phoenix, all perfect condition cost £240 and sell for £98 ono Tel Slough 36428 after 6 pm

Wanted

SWAP Honda CB250 for Sinclair printer Tel 01-651 2257 (Croydon)

WANTED, Vic20 8K and 16K Ram cartridges also utility and games cartridges Tel 0565-4861 (Knutsford)

VIC20 SOFTWARE to buy or swap Tel 061-773 8426 (after 6 30 pm)

MICRO-TAR all hardware + software + firmware Tel 0632 573608 (after 6 pm)

EXCHANGE. 2-3 games depending on price for the Commodore 64 in exchange for colour tv + games feel for £15. Tel Billingshurst 587049 Peter Scot (after 4 pm)

WANTED ZX80 MANUAL needed urgently Swap for ZX Spectrum programs or ZX81 programs or ZX printer paper Telephone Hull (0482) 887279

SWAP VIC20 Chocolate cartridge (boxed) for Thorn EMI 'Submarine Commander' cartridge (boxed) And Swap VIC20 Mission Impossible cartridge for 'The Count' adventure cartridge (boxed) or Pirate Cove cartridge Luton Bedfordshire 505840

WANTED VIC PRINTER Will give Super 8mm sound projector with camera floodlight splicer plus over 1 000 feet comedy and epic films plus up to £60 Or cash only sale Crayford 56948 (after 6 pm)

WANTED Dragon 32 with joystick, preferably still under guarantee price under £100 would consider buying software Tel 021472 5760 Midlands

SWAP Spectrum 48K + fuller synthesizer + plus £60 worth software for Commodore 64 + C2N cassette recorder Tel Stoke on Trent 44724 after 6 pm

WANTED Dragon 32 £100 + for a sound machine delivery/collection arranged Details please to A Ellis 22 Turnavean Road St Austell PL25 5NX Cornwall

WANTED Spectrum Commodore 64 or BBC Micro Model B reasonable price paid Tel 01-854 7913 after for Room No 423

SWAP/WANTED required BBC B with accessories and software for electronic organ Wurlitzer 4030R 2/44 note keyboards 13 pedals multimatic percussion and swinging rhythm Tel Kingskerswell (Devon) 080 47 3074

SWAP four Intellivision cassette cartridges plus one Vic20 cartridge (Space Battle) for any Spectrum Tel 01 958 8643 Edgware Andy

BBC MODEL B 1 2 O/S under £300 Tel 0532 744994

WANTED 48K Spectrum with printer and software Reply by post to Mr P Lynn, 141 Tower Hamlets Road Forest Gate London E7

SPECTRUM 48K with or without accessories and tapes Must be under guarantee Tel Farnborough (Orpington) 58608

SPECTRUM SOFTWARE for sale or swap Loads of games Tel David Reading 0734 661401 after 4 pm

ATARI VCS, paborie + joystick nine cartridges including INDY500 + Centrels Asteroids + Space Invaders £130 Tel 452 4838

ATARI 800 (48K) wanted Must be in the condition Tel Mason 01 836 2742 (day) 04873 424 (home)

WANTED Commodore 64 at a reasonable price Tel 01-465 6641 after 4 pm

WANTED BBC MODEL B with 1.2 o/s, £300 (under) Tel (0532) 744994

SWAP SPECTRUM SOFTWARE (four popular titles) Knot in 3D Jetpac Psion Flight and Cobble worth £24 80 for Spectrum 16 line control port by William Stuart Systems Ltd or sell for £18 00 K Sullivan 20 Stewarts Town Avenue Belfast 11 N Ireland

SWAP MY KNITMASTER 302 knitting machine (does Fair Isle) plus table books winner for plain paper printer or 48K Spectrum Tel 01 807 8853

SWAP ZX81 Flight Simulation cassette perfect condition, for other software Wanted ZX81 64K expansion pack Mr Leese 30 Grainger Close Basingstoke Hants

SWAP SPECTRUM 48K microcomputer complete with operating manuals Mains and power-pack for similar Oric-1 48K microcomputer Eggleton 22 High Street Irthlingborough Northants NN9 5TN Tel 0933 650073

SPECTRUM 16K or 48K wanted also software anything considered cash waiting can collect Phone Upminster (04022) 28270 (ask for Paul)

SWAP ZX SPECTRUM boxed very good condition + recorder + software etc (everything worth £170) For Vic20 starter pack + Ram-pack or software must be boxed (as new) Tel Worthing 37229

WANTED TRS 80 16K model and II power supply + CPU only Tel 0276 25391

BBC B + disk drive wanted Please phone Angus 01 737 0070

SWAP SENSORY CHESS Challenger 9 for 16K Spectrum Phone 0222 881235 and ask for Paul

WANTED SPECTRUM 48K (about £70) Extra for assembler and m/c monitor Tel (0484) 58119

COMMODORE 64 with C2N cassette deck at a reasonable price Tel 445 6641 after 4 pm

SWAP DRAGON SOFTWARE, I have Microdeal Mansion Adventure I would like Microdeal's The King or Frogger Tel eves 0453 49615

EXCHANGE SPECTRUM SOFTWARE for your ZX81 software I have Planetoids Horace Skiing Hungry Horace 3D Tunnel, Avenger Golf Roman Empire plus a few more (originals) Tel after 6 pm Barnsley 70101191

WANTED BBC DISK DRIVE 110K single drive must be in good condition Acorn preferred but will consider others Tel 061 280 0758 evenings

WANTED BBC software Only tapes Acorn software considered Education and games Tel 01-574 4122

WANTED BBC A OR B, in good condition unmodified Tel Lloyd 09 78 732355

SWAP MY MAMIYA PROFESSIONAL CAMERA (2¼ sq) 80mm and 180mm lenses CDS Porrofinder AWD WLF for your Commodore 64 or maybe Dragon 32 Tel Gravesend 24134

WANTED second hand Spectrum 48K Tel Farnham Common 6421

WANTED ZX81 16K, with leads and manual £20 to £25 Please phone Hudds (0484) 30518

SPECTRUM PROGRAM SWAP send tape with instructions and I will send a tape with equal quality program back State Ram. 31 Parsonage Street Bury Lancs BL9 0TE or telephone 061-797 8990

WANTED BBC B for cash Swap CBM 64 Tel 01 568 7325 or 01 568 7375

SWAP CHESS CHALLENGER 9 with nine skill levels cost £190 plus P S U and £200 for BBC 32K or swap the Chess Challenger 9 for any colour micro Tel 01-783 4280 after 5 30 pm

For sale

SWAP Kempston Joystick interface without joystick for AGF joystick interface without joystick. Also software to swap or sell including Jetpac and Pimania Tel Great Harwood 884766 after 6 pm Martin

ACORN ATOM 12 + 12 four books £50 worth games very good condition £75 ono Leicester 840290

I WOULD LIKE to swap Caterpillar and Transylvanian Tower for Penetrator and PSSST Write to 80 Somerton Road Street, Somerset or tel Street 42456 after 4 pm

ZX SPECTRUM books worth £48 + Hobbit Penetrator Jetpac 3-D Tunnel Sell for £50 or computer cassette player and ZX Printer with at least five rolls Tel 035 74 225 after 6 pm

UK 101 CEGMAN, lots of software and information Offers tel 0295 53475

TEXAS TI99/4A with leads good condition £75 ono Tel Chesham (0494) 772544 after 4 30 pm

SOFTWARE FOR SALE. All Spectrum Hobbit £8 Football Manager Time Gate Horris and the Spiders Test Match Super Spy £3 50 each Arcadia Schizoids Space Invaders £3 each Tel Lea Valley 712822 after 4 pm

ATOM 12K plus 12K Ross utility Rom PSU and all leads approximately £80 worth of software two books Magic fields and Getting Acquainted with Your Atom Swap Vic20 with cassette or £100

SWAP ATARI VCS for Spectrum Tel St Helens 811865

PET COMMODORE 2001, replacement 6550 Ram chips normally £15 each A bargain at £5 each Tel 0742 483587 after 6 pm

VIDEO GENIE 16K with boxed media and cassette recorder plus manuals £40 software, also used complete with box £130 or swap for Dragon plus games Tel Lichfield (05432) 28655

PHILIPS G7000 Videopac computer Six videopacs including Munchkins and Quest for the Rings Worth over £130 will sell for only £70 incl tie. Alan Muirs Rosemark, Mouswald Dumfries G01 4LU

FIDELITY SENSORY CHESS CHALLENGER 9 very good condition will swap for 48K Spectrum, preferably with software Tel 0222 881235

SEIKOSHA GP100VC PRINTER with paper two months old, hardly used in excellent condition cost £240 sell for £150 Tel Balcombe 532

TRS 80 LEVEL 2, 48K leads case disk expansion interface recorder disk drive Dosplus operating system manuals books magazines Offers over £600 Centronics 737 printer also available Tel 021-373 3643

OH10 SUPERBOARD Faulty very cheap Intel 8086 and 80186 development systems with MPUs and monitors Open to serious offers or exchange for W H Y? Bridge 363 Kennington Lane Vauxhall London SE11

OFFERS INVITED ZX80 4K/8K Roms (working order) ZX81 (faulty keyboard) 16K Rampack (not working) All manuals and leads only one P S U Tel Frome (0373) 62051 after 6 pm

DRAGON SOFTWARE for sale Ghost Attack (cart) Dragon Mountain and Sultans Maze All three for £22 Tel 061 795 5896 (Manchester)

LYNX 48K as new still under guarantee boxed with manual and basic tape and user mags. £190 Tel Wickford (Essex) 66701

ORIGINAL DRAGON S/W Lots of titles £4 each Tel for details of lists Tel 0532 687964

FOR SALE. Time Gate £2 30 Ah Diddums £2 50 Meteor Storm £2.50 Horace Goes Skiing £2 50 Tower Cyc tyl 40 £3 00 Colossal Adventure (level 8) £7 50 Jet Pac £2.50 for 16 48K Spectrum Tel Westhoughton 816623

SHARP PC3201 computer with disk drive VDU and printer CPM compat also £11 99 ono Tel 01 882 4636 evenings

PROGRAMMERS AID CARTRIDGE and Mission Impossible and wanted speech synthesizer Tel 01-679 2129 after 4 45 pm

VIC20. Swap Jelly Monster for Vassilas Castle Swap Grid Runner Arcadia and many other cassettes hs other software Tel 021 550 0775

TEXAS TI99 CASSETTE LEADS £5 plus Anth VCS and three cartridges Combat, Space Invaders Superman £75 plus CBS Colecovision, three weeks old and three cartridges Zaxx on Smurf, Donkey Kong £150 Tel Coin 07856 7814

CASIOTONE MT-70 KEYBOARD, 20 voices 10 rhythms Autochord and computer memory Barcode music plus reader Cost £200 seven weeks ago accept £150 ono Mason 01 936 2743 (day) 04673 424 (evening)

SHARP MZ80 home compute Almost new boxed power leads manual and demo tape cost £500 sell for £375 ono Tel 0298 79112 or 0785 43299

TWELVE TAPES for Spectrum Adventures Arcade Games and Compiler all at half price Also machine code ends and own file Spectrum at £5 each Tel 02407 (Bucks) 5340

JUPITER ACE plus five games selling for £85 Tel 041-423 7906

MODEL RAILWAY EQUIPMENT for 48K Spectrum of Vic20 Tel 0782 38882 anytime

SHARP MZ 80K plus £250 software three programming books and cover £500 ono Tel 01-455 8641 after 4 pm

LYNX 48K with six tapes book lenx other software Why wait for askvary and pay £298 This can be yours for only £175 immediately Tel Dale Goodier Kendal (0539) 28573

80K SINCLAIR ZX SPECTRUM computing system complete with Kemston joystick ZX printer five books 10 cassette 30 magazines Great bargain at only £230 Tel Graham 03302 2505 for details

INTELLIVISION with five cartridges Soccer Skiing Auto Racing Armour Battle Tron Deadly Discs, £120 ono Tel Shaw 842228

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SWAP my video camera, Hitachi VK-C770 + £50 cash for BBC Model B. Tel. 0484 256116

TI99/4A, extended basic, Adventure games, speech synthesiser speech editor, Parsec, Wumpus, household budget, joysticks £250 or will sell individual items Tel P Richards 0533 50417 after 6 pm

ORIC-1 48K complete with manual psu all leads fourth cassette and documentation assembler/disassembler + some games £140 Tel 0295 50432

ORIC Micro Line 80 printer with video Genie interface hardly used, £225 Tel 0723 583757 anytime

TIME DATA speech synthesiser for sale good condition £80 including speech editing program Tel 869 2900 Ask for Louis

INTELLIVISION, six months old still under guaranteed + soccer cartridge £80 + four other cartridges £10 each. Tel 0602 872915.

LYNX 48K, three months old hardly used £195 including £25 software and books. Tel 01 527 8589 after 6 pm

JUPITER ACE FOR SALE. Facer ex pandable Ram pack, assembler disassembler and other software worth £125 will sell for £75 Tel Crewkerne 72862 evenings only

ES 2016 COMPUTER CASSETTE RECORDER for sale £17 inc p&p Boxed as new only one month old Tel Leeds (0532) 591901 after 4 pm and ask for Wayne (originals price £30)

TRS-80 GREEN SCREEN MONITOR ideal for TRS-80 users £35 Kansas programmer toolkit less than one third of once £10 less! 2 books offers Level 1 books and software £4 lot. Tel 031 742 1448 after 6 pm

TRS-80 MOD 3 48K plus 2-drives plus internal monitor plus 20 disks and much software £895 ono (Wanted model 1 keyboard for project) (sole £1 800 plus Nov/82) 01-572 3917 (HH)

ORIC 48K with cassette recorder Xenon and some ssink cassettes All in good condition boxed good as new £130 Tel 01-228 0484 evenings only ask for Charles Henry Skilbeck.

LTRX 48K, CPM compatible high resolution colour graphics with manual basic cassette and £30 of software as new £180 Tel 051 428-2463

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LYNX 48K, unwanted prize three months old, with plug, introductory tape manual Numerons game Ian Sinclair *Lynx Computing* book, Lynx user magazine all for just £190 ono Tel 0484 39295

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SWAP five Dragon games cassettes for any cartridge or for any books on Dragon Tandy or 6809 or will ask for £4 each Tel 01-821 1710 after 6 pm

ZX PRINTER. Brand new paper six rolls unopened £1 50 each or £10 the lot including postage Alan Turnbull 88 Vickrage Road Stockport SK3 8HL

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16K PET with basic arrow tape unit, tractor printer 3022 as new with manuals, £700 cost £1 800 Additional books and software if requirin Tel 01-979 1491

ORIGINAL HOBBIT PROGRAM with manual, as new £7 Tel 856 7079 Ask for Lenny

ARFON EXPANSION UNIT for Vic20 seven switchable slots £90 Tel 0384 57360

VU 3D 48K, £5 Tel 08078 60927

32K ADD-ON MACHINE for Spectrum 16K model 1 machine £20 Kempston joystick interface £9 Tel Gerrards Cross 887771

ORIC 1 with software valued at £280 good condition swap for ZX Spectrum and software or £130 Tel Northampton 846383

SHARP MZ80A for sale six months old built in monitor and cassette deck manuals and software included £360 Tel Loughborough (0509) 216230 after 6 pm or weekends

ORIC 1, boxed with games to swap for TI99/4A or Dragon or sell for £80 Tel 0636 721378

TRS 80 MODEL 1 LEVEL 2 cassette deck VDU hi-res graphics £120 of software £300 34B Bartholomew Road Kentish Town NW5 Mr Morgan

TRS 80 + expansion interface + 48K complete with video screen disc drive + printer lots of software cost new £1 400 sell for any offer over 400 Tel (0978) 262716 (Wrexham) Also lots of books included

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SHARP MZ-80K, with £300 software, three programming books + dual cover all for £399 Tel 01-455 8641 after 4 pm

ORIC 48K, with over £50 software Fourth Flight, Multigames, Zodiac Space Invaders and Mushroom Mania, £130 Tel 0792 403446

SPEECH SYNTHESISER for the Spectrum any offers welcome Tel Kilbarchan 2398

ORIC 48K CASSETTE RECORDER games tape manual etc book, £130 Tel 860 8816

TRS 80 with 32K interface + monitor + three double density disk drives £990 ono all as new must sell quickly Write to Dave Milburn 8 Queens Walk House Queens Walk Ealing W5

SPECTRUM SOFTWARE, £4 each Penetrator Cneds Flight VU-File Space Raiders, all 48K + books Tel Tandridge (0732) 381930

ADVENTURE HELPLINE

Micro *Dragon 32*
Adventure *Jerusalem Adventure*
Problem *Stuck at the Golden Gate I can t get through it*
Name *Carl Wood*
Address *33 Remington Avenue Sheffield S5 9PA*

Micro *Sinclair Spectrum (48K)*
Adventure *Espionage Island (Adventure D Artic)*
Problem *I cannot seem to progress! I ve got out of the plane shot a guard been to a boat got a rope and beads and that s about it!*
Name *Jeremy Constance*
Address *5 Normanhurst Close Three Bridges Crawley Sussex*

Micro *Spectrum 48K*
Adventure *Inca Curse*
Problem *How to put out the fire in the fire room?*
Name *Guy Walton*
Address *1 Cedarfield Road Lymm Cheshire WA13 9MN*

Micro *Spectrum 48K*
Adventure *Black Crystal*
Problem *How to get through the Shaggoth s lair (map 3)*
Name *Nigel Morse*
Address *11 Green Leafe Avenue Wheatley Hills Doncaster DN2 5RG*

Micro *Spectrum 16K*
Adventure *Artic s Planet of Death*
Problem *How do you press the buttons in the space ship? How do you get out of the lift?*
Name *Craig Murphy*
Address *2 Quick View, Mossley Lancs*

Micro *48K ZX Spectrum*
Adventure *Primitus*
Problem *Finding solution to a key turns the lock This is the first part of the program*
Name *Philip Piers*
Address *53 Lancaster Road Hindley Wigan Lancs WN2 3NJ*

Micro *ZX Spectrum 48K*
Adventure *Knight s Quest*
Problem *I have gone through the iron grating and I have entered a deserted wasteland which I cannot pass*
Name *Gavin Benson*
Address *9 Meadows View Marford Nr Wrexham Clwyd N Wales*

Micro *Spectrum 48K*
Adventure *Mad Martha*
Problem *How do you enter the night club and keep money with you with which to gamble?*
Name *Howard Phillips*
Address *Field Cottage Baskerville Lane Shiplake Oxfordshire*

Micro *ZX Spectrum (48K)*
Adventure *Inca Curse (Adventure B)*
Problem *I cannot get a score cannot use magic ring magic carpet ladder of blue powder also I cannot get down porthole*
Name *Philip Earls*
Address *2 Benjamin Close Hampden Park Eastbourne East Sussex BN22 9JE*

Micro *Sinclair ZX Spectrum (48K)*
Adventure *Black Crystal*
Problem *Getting through the maze of caves in the Shaggoth s Lair on map 3 of the program*
Name *Junior Tech P J Stokes*
Address *GEF RAF Binbrook Near Grimsby Lincolnshire*

NEW RELEASES

CAVEMAN



Softek well known for its Spectrum software has now launched a range of games for the Dragon

Ugh is probably the best of the batch In fact it's one of the best games I've ever seen on the Dragon

Using either the keyboard or a joystick you move a caveman up a hill to collect eggs He is hindered in this task by an enormous Pterodactyl which is dropping rocks on him Should he fail to crush you a Tyrannosaurus called Rex joins in

Armed only with a spear you must try to collect as many eggs as possible — it's very addictive and I've only seen graphics as good in the best of Microdeal's games

Program *Ugh*
Price *£6 95*
Micro *Dragon 32*
Supplier *Softek*
12/13 Henrietta Street
Covent Garden
London WC2E 8LH

JETPAC II

Ultimate Play the Game are one of those few companies whose every release is awaited with anticipation

Lunar Jetman is particularly interesting as it is the first Ultimate game to be larger than 16K — even restricting themselves to 16K, the company wiped the floor with most of the opposition

With 48K what's happened is that the game has got longer and more complex with more graphics and different screens

The *Jetpac* character turns up again, stranded on a hostile planet He must destroy the various alien bases to be found there, either by dropping a bomb on them or firing a cannon As the distances are so vast he is equipped with a lunar rover The problem is that crags in the ground stop the rover forcing the jetman to get out and fill them in

All this is happening whilst various jumping and bouncing aliens threaten your life To summerise, the best graphics yet on the Spectrum a fiendishly difficult and addictive game, but lousy instructions — it took me half an hour to figure out what you're supposed to do

Program *Lunar Jetman*
Price *£5 50*
Micro *Spectrum 48K*
Supplier *Ultimate Play the Game*
Ashby Computers and Graphics
The Green
Ashby de la Zouch
Leics LE6 5JU

SAS

Who Dares Wins is a game for the Commodore 64 by DK'Tronics The company has entered this new and growing market after its success with its many Spectrum programs

Who Dares Wins is a slightly black humoured representation of a terrorist shoot-out You, naturally enough, are a member of the SAS Terrorists have captured a group of innocent civilians and are holding them hostage in a building

Armed with your high powered rifle you must try to pick off the terrorists as they come to the windows without killing any hostages — which will get you demoted

Technically the game is excellent, and personally I enjoyed it, but I wouldn't be surprised if more sensitive soles than myself found the whole idea fairly crass — to say the least

Program *Who Dares Wins*
Price *£5 95*
Micro *Commodore 64*
Supplier *DK'Tronics*
Unit 2 Shire Hill
Industrial Estate
Saffron Walden
Essex CB11 3AX

DANGER UXB

UXB is an unusual game for the Dragon 32 Your task is to defuse an unexploded bomb without getting blown up The problem is you don't know what tools you need for what part of the task, so it's a matter of careful guessing and judgement

The game is probably unique certainly I've never seen anything like it before In a way it's like an adventure game but with just one objective to defuse the bomb

The computer will sometimes offer tips if you type 'Help' and Tools will tell you what you have with you The only problem I would imagine is that presumably there is only one solution to the puzzle — what happens once you solve it?

Program *UXB*
Price *£6 95*
Micro *Dragon 32*
Supplier *Virgin Games*
61/63 Portobello Road
London W11

CLOCK FACE

Beat the Clock teaches the time on both a conventional and digital clockface

Program *Beat the Clock*
Price *£15 00*
Micro *Spectrum 48K/BBC B*
Supplier *Arnold Wheaton Software*
E J Arnold & Son
Leeds LS11 9YY

ROCK AND ROLL

K TEL of 'twenty golden greats' and 'twenty romantic chartbusters' fame has moved into the software market

The company, which has a reputation for picking off existing but faded best sellers and repackaging them to great success using a hard sell and a low price, seems to be repeating their general mode of operation on software

They have called their cassettes all bought in from existing software houses Doublesders — the simple reason for this being that each tape contains two programs

'Ah ha' I hear you cry "Gamespack — boring Basic programs with no imagination and no programming skill in short — rubbish ' Well no, actually, the first of the Spectrum programs *It's only Rock and Roll* with *Tomb of Dracula* on the B side, is really quite good

K Tel programmer Kevin Smith — 'in concert'

Rock and Roll is a simulation program in which you try to guide your rock band to success through a welter of bad press growing debts and doubtful managers

It's very much like DK Tronic's *Dictator* — full of witty touches and in-jokes You can even see highlights of your group in concert!

The game on the other side *Tomb of Dracula* has actually been released before when it was sold for around £5 It is basically a *Hunt the Wumpus* memory maze with *Kingdom* overtones ie making sure you have enough stakes to fight off the ghouls accumulating treasure etc

The Doublepack programs will retail for £6 95 and on the strength of this one would seem to be very good value At the moment the system will cover the Spectrum and Vic20 machines but releases for other computers may follow shortly

Program *It's Only Rock and Roll/Tomb of Dracula*
Price *£6 95*
Micro *Spectrum 48K*
Supplier *K tel House*
620 Western Avenue
London W3 0TU

FINAL HAZARD

Monaco
Alligata
For BBC Model B

Alligata Software is a new company specialising in games programs for the BBC and the Commodore 64

Monaco is it will come as no surprise a racing car game. Your task, simply, is to stay on the track avoiding all the other cars and oil patches

The faster you go round the track, the more points you score There is a final hazard for those who do really well — the road starts to get narrower

Program *Monaco*
Price *£7 95*
Micro *BBC B*
Supplier *Alligata Software*
178 West Street
Sheffield S1 4ET

SWOOP

Intergalactic Force is one of the latest batch of Microdeal releases The company has an excellent reputation for providing top quality Dragon games and *Intergalactic Force* looks well up to standard

Based on a best selling game for the Tandy computer in America, it is pure 'zap the aliens' in the best tradition

Your spaceship hurtles down a narrow channel towards some unknown destination Aliens swoop down, dropping bombs, forcing you to swerve and risk crashing into the sides of the channel

At the same time as all this is going on you are trying to drop down the various vent holes that appear from time to time whilst also replenishing your supply of ammunition by frequent returns to the top of the screen In short, highly addictive stuff

Program *Intergalactic Force*
Price *£8*
Micro *Dragon 32*
Supplier *Microdeal*
41 Truro Road
St Austell
Cornwall PL25 5JE

CRITICAL

A host of nasty egg laying insects form the threat in *Swarm* by Temptation Software

Your star ship has accidentally strayed in the breeding grounds of the Psigophorus which are busily living out their strange life cycle You must prevent them reaching the highest point of evolution and destroying you

Rather than blasting away at anything that moves, the blurb suggests the game is best played tactically by picking off eggs that have reached a critical point

Program *Swarm*
Price *£5 95*
Micro *Vic20*
Supplier *Temptation Software*
58/59 Poland Street
London

EVIL RING

BBC B
Evil Demons

An interesting idea from Excalibur Software Their *Evil Demons* tape is followed by a hints program giving you clues to getting high scores on the game

Despite the adventure sounding title, the program is in fact a quick reaction, arcade style game There are several screens, in the first you must cross a bridge avoiding demons, once across you must enter the house of death in which an evil ring of power is located You must then destroy the ring by starting a fire in the altar at the top of the house (no, I don't understand the connection either)

Program *Evil Demons*
Price *£7 97*
Micro *BBC B*
Supplier *Excalibur Software*
32 Beresford Gardens
Hounslow
Middx TW4 5HW

LATERAL

Yet more releases from Virgin whose output of computer games is reaching astronomical proportions Despite that, the quality seems to be improving because *Ghost Town* for the Spectrum looks like a winner

Ghost Town is in the classic adventure form with mysterious objects, secret doors and plenty of brain curdling exercises in lateral thinking to see you through the cold winter nights

Here and there, graphics illustrate the key scenes and, although not of *Valhalla* quality, they are effectively done It is nice to finally be able to recommend a Spectrum game from Virgin

Program *Ghost Town*
Price *£5 95*
Micro *Spectrum 48K*
Supplier *Virgin Games*
61/63 Portobello Road
London W11

LONE RAIDER

Atari has launched its first UK originated game — *The Lone Raider*

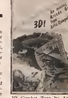
Written by the obligatory whiz kid (an elderly 17 years old though) it is a three part, high speed, arcade style, challenge

The storyline has similarities to Vortex's *Android 1* You must move your man into a nuclear power factory to remove a neutron power source — energy for a hord of nasty aliens

Getting to the source naturally involves you battling your way through various obstacles A good game undoubtedly, and professionally packaged but at a price few other companies would dare to charge

Program *The Lone Raider*
Price *£14 99*
Micro *Atari 400/800*
Supplier *Atari Inc*
Software Products
Division
Slough
Berks

ROTATING



3D Combat Zone by Artic introduced a number of interesting techniques to give the illusion of depth to the screen picture

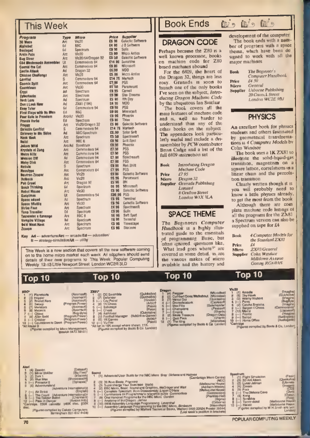
The game author, John Ritman, has used these techniques in a new game, *Dimension Destructors*.

Although based on the basic format of goodie spaceship against baddie spaceships, the game is made much more exciting by 3D From the distance, the alien fleets emerge first as specks and than as weird rotating pyramids and other geometric shapes

The effects are quite impressive and revitalise an otherwise ailing and overdone concept

Program *Dimension Destructors*
Price *£5 95*
Micro *Spectrum 48K*
Supplier *Artic Computing*
Main Street
Brandesburton
Driffield YO25 8RL

New Releases is designed to let people know what software is coming on to the market If you have a new game or utility which you are about to release send a copy and accompanying details to New Releases Popular Computing Weekly 12-13 Little Newport Street London WC2R 3LD



This Week

Program	Type	Micro	Price	Supplier
3D Maze	Arc	Vic20	£5.95	Galactic Software
Alphabet	Ed	BBC	£4.95	J B Software
Besieged	Ed	Spectrum	£9.95	Sulis
Brain Pain	Arc	Vic20	£5.00	Micro Antics
Bug Diver	Arc	Vic20/64/Dragon 32	£5.50	Galactic Software
C64 Mikrocode Assembler	Ut	Commodore 64	£14.95	Sunshine
Cosmid the Cat	Arc	Commodore 64	£9.95	Microsoft
Castle Attack	Ad	Dragon 32	£6.00	MOO
Chicken Challenge	Arc	Vic20	£5.95	Micro Antics
Centilla	S	Commodore 64	£14.75	Martech
Cosmic Split	Arc	Commodore 64	£7.95	PSS
Countdown	Arc	Vic20	£9.50	Paramount
Crypt	Ad	Spectrum	£9.95	Carnell
Cybertanks	Arc	Spectrum	£9.95	Star Dreams
Dark Lore	Ad	Spectrum	£5.95	8th Day
Don't Look Now	Ad	ZX81 (16K)	£4.95	MOO
Easy Tutor	Ed	Commodore 64	£9.95	PSS
First Steps with the Mr Men	Ed	BBC	£9.95	Mirrorsoft
Four Gate to Freedom	Arc/Ad	Vic20	£9.95	Phoenix
French Verbs	Ed	Spectrum	£5.95	Thies
Froggy	Arc	Vic20/Dragon 32	£5.95	Galactic Software
Galactic Conflict	S	Commodore 64	£14.75	Martech
Gateway to the Salon	Ad	BBC/Spectrum	£8.00	Solar Soft
Hack Hack	Arc	Spectrum	£5.50	Spectresoft
Balzi	Arc	BBC B	£9.95	Soft Spot
Jokers Wild	Arc/Ad	Spectrum	£9.95	Phoenix
Krystals of Zong	Arc	Commodore 64	£7.95	PSS
Metro Blitz	Arc	Commodore 64	£7.95	PSS
Mission Off	Ad	Commodore 64	£7.95	Spectresoft
Moby Dick	Arc	Commodore 64	£7.95	PSS
Nebula	S	Spectrum	£9.95	Red Shift
Neoclyps	Arc	Commodore 64	£7.95	PSS
Neutron Zapper	Arc	Vic20	£9.95	Galactic Software
Outback	Arc	Vic20	£6.95	Paramount
Pub Crawl	Arc	Dragon 32	£5.95	BH
Quick Thinking	Ed	Spectrum	£6.95	Mirrorsoft
Robot Mouse	Arc	Vic20	£5.95	Galactic Software
Scriptmos	Ut	Commodore 64	£30.95	PSS
Space Island	Ad	Spectrum	£5.95	Terminal
Space Shuttle	Arc	Vic20	£5.95	Galactic Software
Strike Four	Arc	Spectrum	£4.95	Spectresoft
Time Traveller	Ed	Spectrum	£5.95	Sulis
Transeder's Revenge	Arc	BBC B	£6.95	Soft Spot
Vampire Village	Ed	Spectrum	£6.95	Terminal
94th West Hack	Arc	Spectrum	£5.95	Timescape
Zaxxon	Arc	Spectrum	£5.95	Starzone

Key Ad — adventure/Arc — arcade/Ed — education/
S — strategy-simulation/Ut — utility

This Week is a new section that covers all the new software coming on to the home micro market each week. All suppliers should send details of their new programs to This Week, Popular Computing Weekly, 12-13 Little Newport Street, London WC2R 3LD

Book Ends

DRAGON CODE

Perhaps because the Z80 is a well known processor, books on machine code for Z80 based machines abound.

For the 6809, the heart of the Dragon 32, things are less rosy. Granada is soon to launch one of the only books I've seen on the subject, *Introducing Dragon Machine Code* by the ubiquitous Ian Sinclair.

The book covers all the main features of machine code and is, well, no harder to understand than any of the other books on the subject. The appendices look particularly useful and include a disassembler by *PCW* contributor Brian Cadge and a list of the full 6809 instruction set.

Book *Introducing Dragon Machine Code*
Price *£7.95*
Micro *Dragon 32*
Supplier *Granada Publishing Limited, 8 Grafton Street, London W1X 3LA*

SPACE THEME

The Beginners Computer Handbook is a highly illustrated guide to the essentials of programming Basic, but often ignored questions like, 'What lead goes where?' are covered in some detail, as are the various makes of micro available and the history and development of the computer.

The book ends with a number of programs with a space theme, which have been designed to work with all the major machines.

Book *The Beginner's Computer Handbook*
Price *£4.50*
Micro *General*
Supplier *Usborne Publishing, 20 Garrick Street, London WC2E 9BJ*

PHYSICS

An excellent book for physics students and others fascinated by geometrical transformations is *4 Computer Models* by Colin Windsor.

The book uses a 1K ZX81 to illustrate the solid-liquid-gas transition, magnetism on a square lattice, correlations in a linear chain and the percolation transition.

Clearly written though it is you will probably need to know a little physics already, to get the most from the book.

Although there are complete machine code listings of all the programs for the ZX81 a Spectrum version can also be supplied on tape for £4.

Book *4 Computer Models for the Standard ZX81*
Price *£4*
Micro *ZX81/General*
Supplier *Colin Windsor, Milldown Avenue, Goring RG8 0AS*

Top 10

BBC*

1	(1)	Planetoids	(Acornsoft)
2	(3)	Hopper	(Acornsoft)
3	(2)	Rocket Raid	(Acornsoft)
4	(6)	Swoop	(Program Power)
5	(7)	Monsters	(Acornsoft)
6	(8)	Meteors	(Acornsoft)
7	(—)	Chess	(Bug-Byte)
8	(9)	Alien Swirl	(Program Power)
9	(—)	Croaker	(Program Power)
10	(—)	Countdown to Doom	(Program Power)

*All Model B
(Figures compiled by Micro Management, Ipswich 0473 59181)

ZX81*

1	(2)	QS Scramble	(Quicksilva)
2	(7)	Defender	(Quicksilva)
3	(—)	City Patrol	(Sinclair)
4	(6)	1K Chess	(Artic)†
5	(—)	Sabotage	(Psion)
6	(—)	Chess	(Psion)
7	(4)	AstMoids	(Quicksilva)
8	(1)	Football Manager	(Addictive Games)
9	(5)	1K Games	(Artic)†
10	(—)	Vu-File	(Psion)

*All run in 16K except where shown †1K.
(Figures compiled by Boots & Co, London)

Dragon

1	(4)	Frogger	(Microdeal)
2	(3)	Cuthbert Goes Walkabout	(Microdeal)
3	(7)	Manic Out	(Quicksilva)
4	(—)	Droneclaiank	(Cablesoft)
5	(—)	Max Flite	(Salamander)
6	(—)	Champions	(Peaksoft)
7	(—)	Empire	(Shards)
8	(6)	Beds Treasure	(Dragon Data)
9	(—)	Quiz Pack	(Shards)
10	(1)	The King	(Microdeal)

(Figures compiled by Boots & Co, London)

Vic20

1	(1)	Arcadia	(Imagine)
2	(6)	Sky Hawk	(Quicksilva)
3	(3)	Wacky Waiters	(Imagine)
4	(—)	Panic	(Bug-Byte)
5	(2)	Catcha Snatcha	(Imagine)
6	(—)	Sargon II Chess	(Commodore)*
7	(10)	Metal	(Llamasoft)
8	(—)	Frantic	(Imagine)
9	(—)	Sensei	(Audiogenic)
10	(—)	Home Office	(Audiogenic)

*Cartridge
(Figures compiled by Boots & Co, London)

Atari

1	(4)	Zaxxon	(Datasoft)
2	(1)	Miner 2049er	(Big Five)*
3	(2)	Zork 1	(Infocom)
4	(5)	Mad Max	(Showcase)†§
5	(—)	Protector II	(Synapse)*
6	(6)	Adventureland	(Adventure International)‡
7	(—)	Air Strike	(English)
8	(—)	The Count	(Adventure International)†
9	(—)	The Hidden Baton	(Channel 8)
10	(—)	Pass in Danger	(Avalon Hill)‡

*Cartridge. †16K cassette ‡48K disc. §32K disc.
(Figures compiled by Calisto Computers, Birmingham 021-632 6458)

Books

1	(1)	Advanced User Guide for the BBC Micro, Bray, Dickens and Holmes	(Cambridge Micro Centre)
			(NEC)
2	(5)	30 Rom Beats, *Prigmore*	(Melbourne House)
3	(3)	Supercharge Your Spectrum, *Webb*	(Addison-Wesley)
4	(2)	BBC Micro, Basic, Sound and Graphics, *McGregor and Watt*	(Melbourne House)
5	(—)	Complete Spectrum Rom Disassembly, *Logan O'Hara*	(Commodore)
6	(—)	Commodore 64 Programmer's reference guide, *Commodore*	(Prentice-Hall)
7	(9)	One Hundred Programs for the BBC Micro, *Gordon*	(Sigma)
8	(—)	Anatomy of the Dragon, *James*	(Osborne)
9	(10)	6809 Assembly Language Programming, *Leventhal*	(Macmillan)
10	(—)	Assembly Language Programming for the BBC Micro, *Birnbaum*	

(Figures compiled by Watford Technical Books, Watford (0923 23324 Prestel 38844)
(Last week's position in brackets)

Spectrum

1	(1)	Flight Simulation	(Psion)
2	(6)	3D Ant Attack	(Quicksilva)
3	(2)	Lunar Jetman	(Ultimate)
4	(4)	Zzoom	(Imagine)
5	(9)	Pool	(CDS)
6	(—)	The Dickens Cave	(Doric)
7	(3)	Kong	(Ocean)
8	(—)	Scrabble	(Psion)
9	(—)	Terror-daktil	(Melbourne House)
10	(—)	Hobbit	(Melbourne House)

(Figures compiled by W H Smith and Son, London)



Ziggurat

Expert errors

An expert has been defined as a person who has made all the errors in a subject there are to make.

One reason I might be accounted an expert is that I have made my full quota of mistakes. It is to my benefit that in early days most of the errors were made for me. At that time I was teaching Fortran programming without a great deal of experience of either — Fortran or teaching.

I found when advising students about their programs and de-bugging their crashed efforts that they made mistakes I never would have contemplated could exist. Some of the mistakes were so sensible yet so wrong that I have been left with a keen perception of the pitfalls to avoid.

How many of you (in a different context) have seen the response to the question "Which number do you wish to try?" being "Thirteen", and not "13"? Obvious when you think about it but few think about it.

One of the most important lessons I learnt from my short excursion into the teaching of programming was to be systematic. Like many other applied Fortran programmers I found that the only way to ease the burden was to program in a systematic manner.

We did not grace our travails with the accolade "structured" or anything so pretentious. We programmed in such a way as to make our programs easy to de-bug and as transportable as possible.

The modular aspect of programming was emphasised with extensive use of subroutines (to help locate problems more precisely). The use of systematic methods also increased our productivity and the reliability of our product.

We tried not to use too many system dependent tricks because we knew machines changed, places of work changed, and we wanted to be able to continue to use our programs. Sometimes we had to use special facilities and then a small amount of changing of code was inevitable.

The ideas behind systematic programming were also important when I started to use Basic, a language so like Fortran that I felt at home without any effort. When I had come to teach myself Fortran (after being taught Algol 60) the change had been rather more dramatic.

When these students had problems, they were the same sort of problems I see in many of the programs in Open Forum. Plenty of subroutines but no system.

When programming it is important to concentrate on the grand design and then let the minor parts of the design expand to fill it. The grand design is not produced by over concentration on the evils of the *Goto* statement. Examine most books on so-called structured programming and try to divine the structure. Many such efforts are no more than bags of tricks.

One of the most difficult tasks in programming is the conversion of a complex program for one computer to run on another — possibly in a different language. The reason why it is so difficult is that there is a strong tendency to produce a line by line copy of the existing program — without really considering the whole system.

One person I know who tried to convert a large Spectrum program into a BBC program could not fit the new program on the BBC. When I noted that the original design was inefficient, and was allowed to be so because of the greater Ram on the Spectrum, the program was redesigned — and fitted easily.

When Philip Mitchell (writer of *The Hobbit*) says that the 6502 is an inferior processor to the Z80 because the 6502 has a very simple instruction set (*Popular Computing Weekly* October 27) we are given cause to wonder.

When he says that "what takes one or two instructions on the Z80 takes four or five on the 6502", we know he must be performing a line-by-line translation. He does not appreciate the powerful simplicity of the 6502. ■

Boris Allan

Puzzle

Artistic thought

Puzzle No 82

Illustrated is one of a sequence of works. If we could reproduce it in colour you would see that the three squares on the left of the painting are red while the two on the right are green.

Each painting contains five squares each of different size and with sides an exact number of inches in length. The side lengths (one side length per square) of the red squares when added give the same total as that formed by adding the corresponding lengths of the green squares. Also areas of both colours are equal.

For the work pictured the red squares are one, two and six inches square, the the green ones measure four and five inches. Thus each colour has a side length measurement of 9 inches and an area of 41 square inches.

If the largest square in any of the series of paintings is 12 inches square what other sets of squares are used and how many works form the collection?

Solution to Puzzle No 77

The program tests all the 1296 possible throws with four dice and totals up the results.

```
10 LET ODD = 0 20 LET EVEN = 0 30 FOR A = 1 TO
6 40 FOR B = 1 TO 6 50 FOR C = 1 TO 6
60 FOR D = 1 TO 6
70 LET P = A*B*C*D 80 LET P$ = STR$ P 90 IF
P<10 THEN GOTO 160 100 LET P = 0 110 FOR N =
1 TO LEN P$ 120 LET P = P + VAL P$(N) 130 NEXT
N 140 LET P$ = STR$ P 150 IF P > 9 THEN GOTO
100 160 IF P/2 = INT (P/2) THEN LET EVEN = EVEN
+ 1 170 IF P/2 <> INT (P/2) THEN LET ODD = ODD
+ 1 180 NEXT D 190 NEXT C 200 NEXT B 210 NEXT
A 220 PRINT "NO OF EVENS = "EVEN 230 PRINT
"NO OF ODDS = "ODD
```

Artful Harry's bet was heavily loaded against the punter. Of the 1296 throws only 380 of them will result in an even result and a win for the punter.

Winner of Puzzle No 77

The winner is Norman Kaye, Warrington, Stoke-on-Trent who receives £10